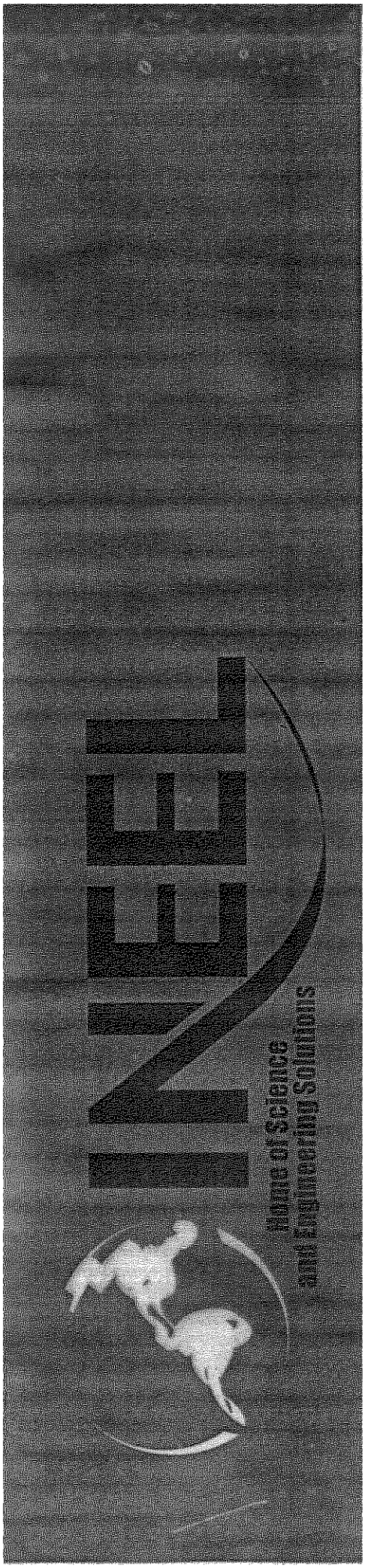

INEEL/EXT-2000-00257
Revision 2

Health and Safety Plan for Operable Unit 3-13, Group 4, Perched Water Project

December 2004

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Revision 2
Project No. 15737

Health and Safety Plan for Operable Unit 3-13, Group 4, Perched Water Project

December 2004

Idaho National Engineering and Environmental Laboratory
Environmental Restoration Program
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-99ID13727

ABSTRACT

This Health and Safety Plan (HASP) establishes procedures and requirements used to eliminate or minimize personnel health and safety risks while working on the Operable Unit 3-13, Group 4 Perched Water Project as required by the Occupational Safety and Health Administration standard "Hazardous Waste Operations and Emergency Response" (1910.120 and/or 1926.65). This HASP contains information concerning the hazards involved in work performance as well as the specific mitigative strategies and equipment integrated in the work process to protect personnel conducting project activities.

This plan has been prepared to comply with the authorized safety basis as detailed in the Idaho Nuclear Technology and Engineering Center authorized safety basis and hazard classification per the applicable preliminary hazard assessment, auditable safety analysis, or safety analysis report, if applicable.

This HASP is intended to give safety and health professionals the flexibility to establish and modify site safety and health procedures throughout the entire span of site operations based on the existing and anticipated hazards without changing this document.

CONTENTS

FIGURES

TABLES

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ALARA	as low as reasonably achievable
ARDC	Administrative Record and Document Control
ANSI	American National Standards Institute
BBWI	Bechtel BWXT Idaho, LLC
CAM	continuous air monitor
CERCLA	Comprehensive Environmental, Response, Compensation and Liability Act
CFA	Central Facilities Area
COC	contaminant of concern
CRC	contamination reduction corridor
CRZ	contamination reduction zone
CWA	controlled work area
DAC	derived air concentration
dBA	decibel A-weighted
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
EPA	Environmental Protection Agency
ERO	Emergency Response Organization
ES&H/QA	environment, safety, and health/quality assurance
EZ	exclusion zone
FFA/CO	Federal Facility Agreement and Consent Order
FTL	field team leader
GI	gastrointestinal
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air
HSO	health and safety officer
IDLH	immediately dangerous to life or health
IH	industrial hygiene
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center

ISMS	Integrated Safety Management System
JSA	job safety analysis
JSS	job site supervisor
LEL	lower explosive limit
NEPA	National Environmental Policy Act
NIOSH	National Institute of Occupational Safety and Health
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OU	operable unit
PEL	permissible exposure limit
PM	project manager
PPE	personal protective equipment
RadCon	Radiological Control
RCIMS	Radiological Control and Information Management System
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RE	radiation engineer
RI/BRA	remedial investigation/baseline risk assessment
ROD	Record of Decision
RWP	radiological work permit
SAM	Sample and Analysis Management
SCBA	self-contained breathing apparatus
SE	safety engineer
SH&QA	safety, health, and quality assurance
SRPA	Snake River Plain Aquifer
STEL	short-term exposure limit
STR	subcontractor technical representative
SWP	safe work permit
SZ	support zone
TLV	threshold-limit value
TRAIN	Training Records and Information Network
TRU	transuranic
TWA	time-weighted average

UV	ultraviolet light
VPP	Voluntary Protection Program
WAG	waste area group
WCC	Warning Communications Center

Health and Safety Plan for Operable Unit 3-13, Group 4, Perched Water Project

1. INTRODUCTION

This Health and Safety Plan (HASP) establishes the procedures and requirements used to eliminate or minimize health and safety hazards to personnel working on the Operable Unit (OU) 3-13, Group 4 Perched Water Project, hereafter referred to as the "Perched Water Project" at the Idaho National Engineering and Environmental Laboratory (INEEL) located within the State of Idaho as shown in Figure 1-1.

The preparation of this HASP is consistent with information found in the National Institute of Occupational Safety and Health (NIOSH)/Occupational Safety and Health Administration(OSHA)/United States Coast Guard (USCG)/U.S. Environmental Protection Agency (EPA) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985); Company Manual 14A, Safety and Health - Occupational Safety and Fire Protection; Company Manual 14B, Safety and Health - Occupational Medical and Industrial Health; Company Manual 15A, Radiation Protection INEEL Radiological Control (PRD-183); Company Manual 15B, Radiation Protection Procedures; and Company Manual 15C, Radiological Control Procedures.

This HASP governs activities performed by employees of Bechtel BWXT Idaho, LLC (BBWI), subcontractors to BBWI, employees of other companies, or the U.S. Department of Energy (DOE) laboratories, in support of the OU 3-13 post-Record-of-Decision (ROD) vadose zone and aquifer well drilling projects. Persons not normally assigned to work at the site, such as representatives of the DOE, the State of Idaho, OSHA, and the Environmental Protection Agency (EPA) are considered nonworkers who fall under the definition of "occasional site workers," as stated in OSHA 29 CFR 1910.120/ 29 CFR 1926.65.

This HASP complies with the authorized safety basis detailed in the Idaho Nuclear Technology and Engineering Center (INTEC) authorized safety basis and "Other Industrial" classification per the applicable preliminary hazard assessment, auditable safety analysis, or safety analysis report, if applicable.

This HASP has been reviewed and revised, as deemed appropriate, by the Clean/Close INTEC Subproject 6 health and safety officer (HSO) in conjunction with other project personnel and management to ensure its effectiveness and suitability.

1.1 INEEL Site Description

The INEEL, formerly the National Reactor Testing Station (NRTS), encompasses 2,305 km^2 (890 mi^2) and is located approximately 55 km (34 mi) west of Idaho Falls, Idaho (see Figure 1-1).

The United States Atomic Energy Commission, now the DOE, established the NRTS in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL has also been a storage facility for transuranic (TRU) radionuclides and radioactive low-level waste since 1952. At present, the INEEL supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation

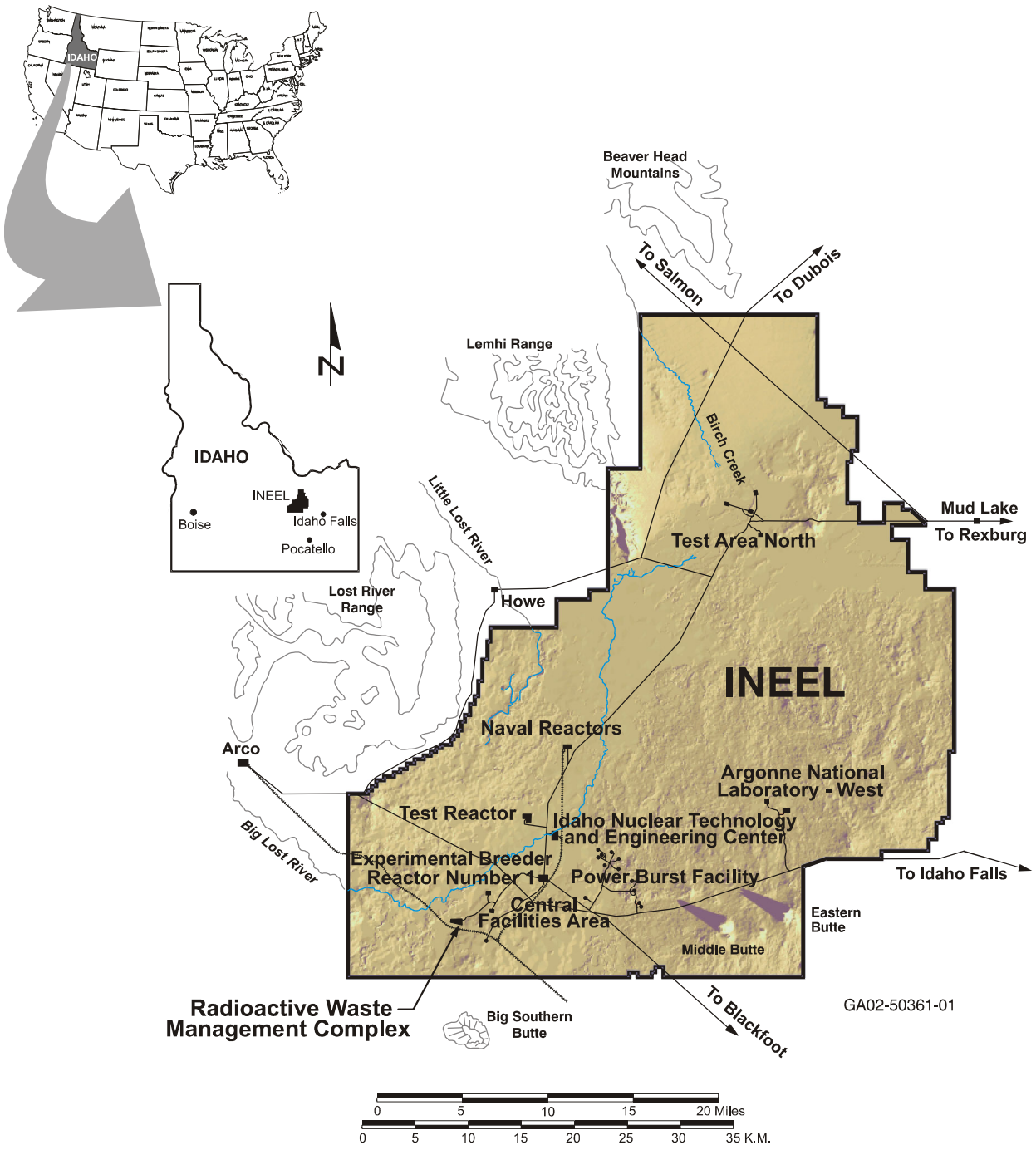


Figure 1-1. Map of the Idaho National Engineering and Environmental Laboratory.

programs. The Department of Energy Idaho Operations Office (DOE Idaho) has responsibility for the INEEL, and designates authority to operate the INEEL to government contractors. BBWI, the primary contractor at the time this document was written for DOE-Idaho at the INEEL, provides managing and operating services to the majority of INEEL facilities.

Because of soil and groundwater contamination resulting from past operations, the INEEL was placed on the *National Priorities List* in November 1989 (54 FR 48184). A Federal Facility Agreement

and Consent Order (FFA/CO), to direct the cleanup activities at the INEEL, was negotiated and signed on December 9, 1991, with the EPA and the Idaho Department of Environmental Quality. The INEEL was subdivided into 10 Waste Area Groups (WAGs) to facilitate management of the cleanup. This HASP specifically addresses work that will be performed at INTEC, which is a facility within the INEEL. The INTEC is designated as WAG 3. Figure 1-1 identifies the INEEL in Idaho and the major facility locations inside the INEEL.

1.2 INTEC Site Description

The INTEC, previously named the Idaho Chemical Processing Plant, has been in operation since 1954. The INTEC has historically been a uranium reprocessing facility for defense projects and for the research and storage of spent nuclear fuel. In 1992, the DOE phased out the reprocessing operations and rescoped the mission: (1) to receive and temporarily store spent nuclear fuel and other radioactive wastes for future disposition, (2) to manage waste, and (3) to perform remedial actions. Figure 1-2 is a map of the INTEC.

A comprehensive operable unit, OU 3-13, was established to provide an overall evaluation of previously identified release sites at the INTEC. During 1997, a remedial investigation and baseline risk assessment (RI/BRA) was completed. The RI/BRA identified contaminants in the vadose zone and perched water and the Snake River Plain Aquifer (SRPA). The contaminants detected are identified and discussed later in this HASP in Section 1, Hazard Assessment.

During the preparation of the OU 3-13 remedial investigation/feasibility study, it became apparent that sufficient data were not available to select groundwater flow and transport model parameters with respect to the tank farm. Therefore, the tank farm release sites defined, as Group 1 in the OU 3-13 Feasibility Study Supplement Report (DOE-ID 1998), were to be further investigated as OU 3-14. This allowed for two decisions regarding risks to the SRPA. Operable Unit 3-13 provided a decision for risks to the SRPA outside the INTEC fence, and OU 3-14 was to provide a decision inside the INTEC fence.

Subsequent to the OU 3-13 RI/BRA, an evaluation of remedial alternatives was made in a feasibility study and the selected alternatives were described in the OU 3-13 ROD (DOE-ID 1999). Subsequently, a rescoping of OU 3-14 occurred in late 1999. This re-scoping led to the reassignment of the OU 3-14 aquifer well drilling project, planned as a remedial investigation, to OU 3-13 monitoring programs. This HASP was prepared to support post-ROD monitoring and to be implemented as part of the remedial actions for the perched water and the SRPA. Monitoring includes well installation activities to produce monitoring wells.

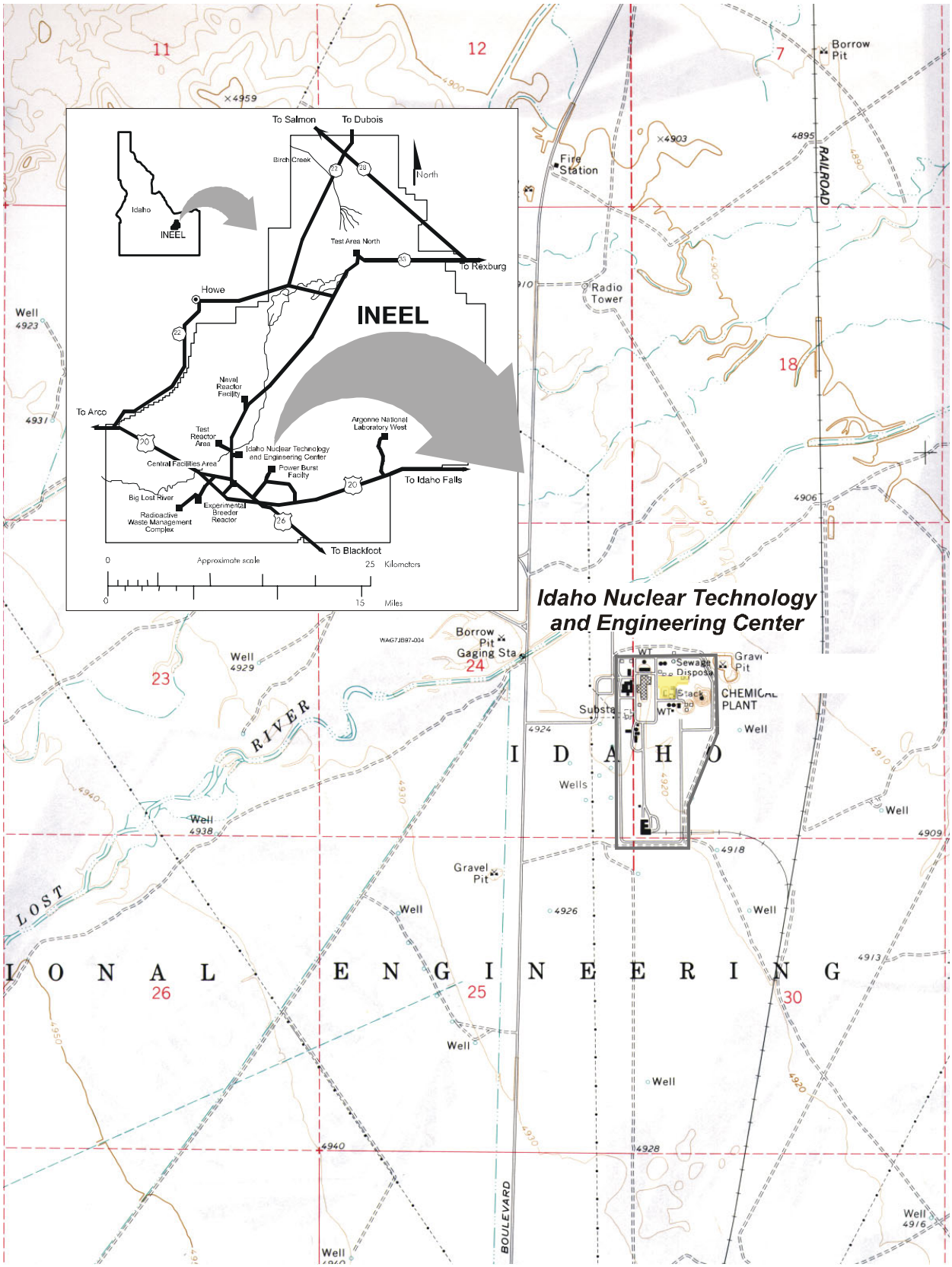


Figure 1-2. Map of the Idaho Nuclear Technology and Engineering Center.

2. SITE BACKGROUND AND PROJECT SCOPE

Group 4 perched water wells have been mostly completed in key stratigraphic units of sediment or interbeds. A phased approach to perched well installation is proposed. During Phase I, the nature and extent of perched water sources around the tank farm and the percolation ponds were largely determined. Also included in Phase I activities were tracer test studies and perched water sampling which will continue, as deemed necessary. Phase II activities include well installation and routine sampling activities. Remedial objectives for these wells are defined in the OU 3-13 ROD (DOE-ID 1999).

2.1 Phase I Activities

The Phase I wells were drilled (see Figure 2-1) to better determine the perched water recharge sources and in particular, to support the tracer tests. The goal of each tracer test (and the well location selection) is to provide information about the hydraulic connection between the recharge sources and the upper and lower perched water zones.

Perched water sampling will continue to be performed at the three depths of concern: alluvium/basalt interface 9.0 to 13.7 m (~30 to 45 ft), upper perched water (33.5 to 36.6 m [110 to 140 ft]), and lower perched water (115.8 to 128 m [380 to 420 ft]). The deepest well in each set will be drilled first. After the deep well is drilled, it will be geophysically logged. The borehole geophysical logs provide information on stratigraphy and locations of perched water; they also are used to determine completions for each subsequent well in the set. Drilling of the subsequent wells is accomplished through reverse air rotary drilling with a conversion to core drilling near the interbeds targeted for sampling. The boreholes are completed with tensiometers, suction lysimeters, and a piezometer. This approach provides the best control possible for the tracer test.

Soil samples are collected for analysis of contaminant concentrations, hydraulic, and geochemical properties. Additional sample material are retained for contaminant transport studies (batch and column test) and archival samples for treatability studies.

As a part of this phase, groundwater samples are collected as part of the tracer test. Samples will also be collected and analyzed for contaminants of concern (COCs). Actions associated with this task involve well purging and sample collection.

2.2 Phase II Activities

Phase II consists of two specific tasks: (1) the installation of wells to provide additional monitoring and COCs sampling locations and (2) monitoring the perched water drain out and flux to the SRPA. The well sets will contain a minimum of two wells, one to be completed in the upper perched water zone, another to be completed in the lower perched water zone/SRPA. Well completion details are presented in the INTEC 2005 Well Installation Plan (DOE-ID 2004a)

The monitoring of the perched water of the perched water drain out and flux is a requirement of the WAG 3 OU 3-13 ROD. The routine sampling events will continue for at least five years after the relocation of the percolation ponds. The scope of these routine monitoring activities are defined in the Monitoring System and Installation Plan (DOE-ID 2004b).

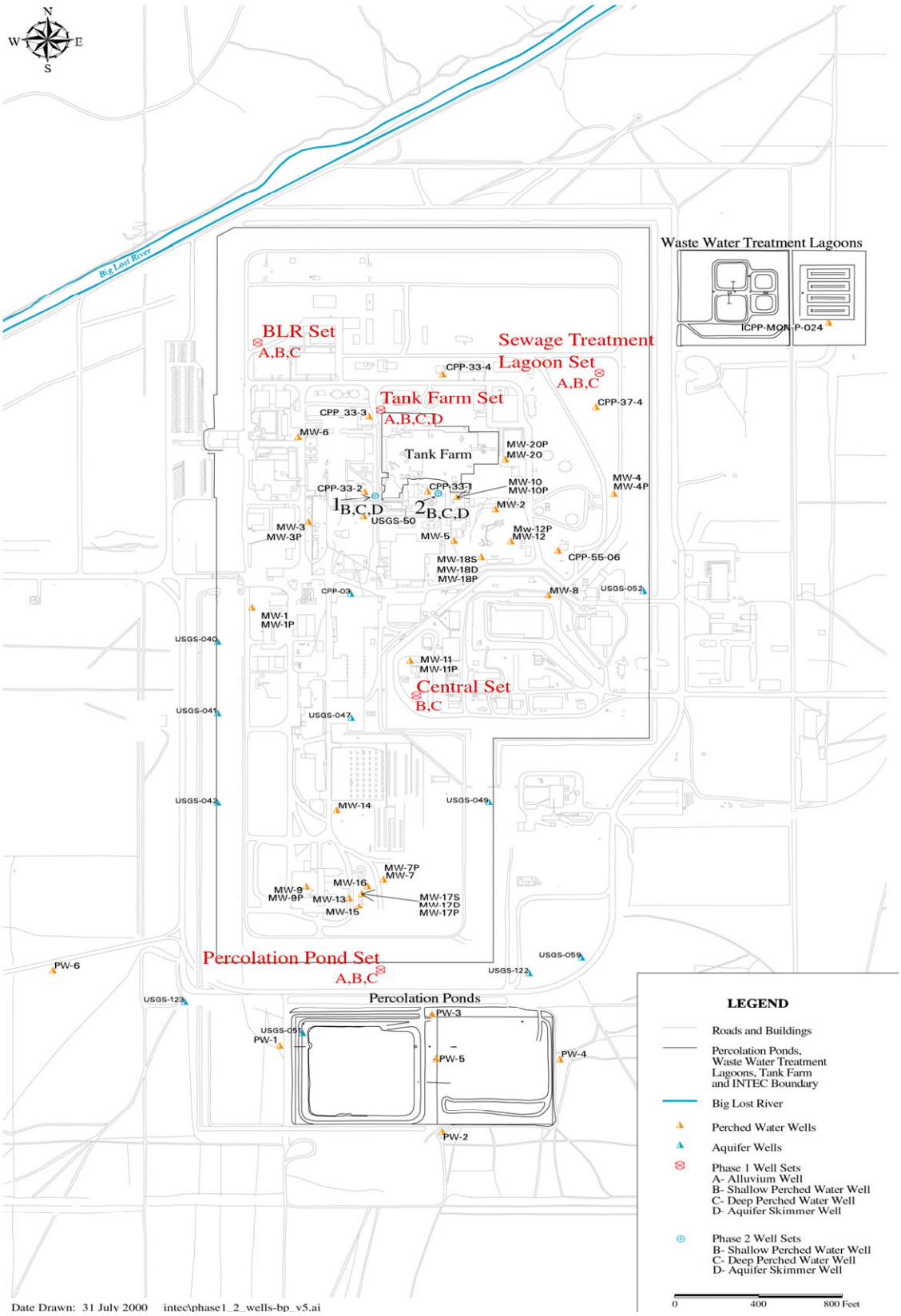


Figure 2-1. Proposed locations for perched water monitoring wells.

As a part of this phase, an initial round of groundwater samples will be collected. Samples will be collected and analyzed for COCs and water quality parameters. Actions associated with this task involve well purging and sample collection.

Two well sets will be installed in 2005 with each well set comprised of two individuals wells (DOE-ID 2004a. A shallow perched water monitoring well will be constructed to monitor water quality within the shallow perched water zone at approximately 100 to 150 ft below land surface (bls) and will be constructed using 2-in.-diameter stainless-steel casing and screen with a dedicated submersible pump. The second well of each set will be constructed with a duel completion to monitor water quality within the SRPA at approximately 485 ft bls and the deep perched water zone at approximately 380 ft bls. The aquifer monitoring well will be constructed with 6-in.-diameter stainless-steel casing and screen with a dedicated submersible pump installed into the SRPA and a 1-in. "Barcad™" system installed into the deep perched zone.

The western well set consisting of ICPP-2018 (shallow perched well) and ICPP-2020 (deep perched/aquifer well) is located south of the INTEC stack and west of the old waste calcine facility. The eastern well set consisting of ICPP-2019 (shallow perched well) and ICPP-2021 (deep perched/aquifer well) is located in the area east of the CPP-742/747 bin sets.

2.3 Phase II Routine Sampling

The Monitoring System and Installation Plan (DOE-ID 2004b) covers the continued collection of groundwater samples from newly installed and existing wells and lysimeters. This activity will continue for a minimum of five years after relocation of the percolation ponds. Actions associated with this task involve well purging and sample collection.

2.4 Program Interfaces

PLN-804 describes the working relationships for activities and programs conducted at the INTEC. The programs at INTEC are being conducted under the regulatory authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC 9601 et seq.); the Final ROD for INTEC, WAG 3, OU 3-13 (DOE-ID 1999); and FFA/CO (DOE-ID 1991).

3. HAZARD ASSESSMENT

This document contains requirements for both contractor and subcontractor personnel conducting work at the INEEL. Contract personnel normally comply with companywide applicable company polices, procedures, and manuals as well as requirements outlined in work control documents, job safety analyses (JSAs), radiological work permits (RWPs), and this HASP in addition to their established safety and health programs and procedures. Subcontractors will be held responsible to follow their company safety and health program and procedures in addition to contract outlined requirements. The subcontractor is responsible for performing required subcontractor personnel exposure monitoring (i.e., noise, air, chemical, etc.) and equipment to perform monitoring.

The magnitude of danger presented by hazards to personnel entering work zones is dependent on both the nature of tasks being performed and the proximity of personnel to the hazards. Engineering controls will be implemented (whenever feasible) along with administrative controls, work practices, and PPE to mitigate potential exposures and hazards. Hazard mitigation provided in this section in combination with other work controls (e.g., technical procedures, work orders, job safety analysis, and GDE-6212, "Hazard Mitigation Guide for Integrated Work Control Processes") will be used, where applicable, to eliminate or mitigate project hazards.

3.1 Hazard Evaluation of Project Activities

Personnel may be exposed to safety hazards or to chemical, radiological, and/or physical agents while working on project tasks. The degree of the hazards posed depends on the nature of contaminants encountered and the specific tasks being performed. Table 3-1 summarizes the anticipated hazards associated with various project activities. Table 3-2 identifies the contaminants and maximum concentration levels that have been detected in the respective media in the project area (from the OU 3-13 Remedial Investigation/Feasibility Study [DOE-ID 1997] and OU 3-13 ROD [DOE 1999]) that project personnel could be potentially exposed. Additional contaminants and associated levels determined by applicable company polices and procedures.

The project activities may involve radiological hazards which will be monitored by on-Site radiological control technicians (RCTs), as they determine necessary. RCTs will develop RWPs, as needed, in accordance with applicable company manuals. Safe work permits may be prepared using applicable company polices and procedures. For instances where the project/task JSA does not address task hazards, a safe work permit (SWP) may be used as a temporary means of hazard identification and mitigation until the JSA is updated to reflect identified hazards. The RWP and JSAs will be used in conjunction with this HASP to address hazardous and radiological conditions at the site. These documents will augment this HASP and further detail protective measures, personal protective equipment (PPE), and dosimetry requirements.

Table 3-3 presents an evaluation of these radiological and inorganic contaminants with respect to potential routes of exposure and symptoms of over-exposure. Additionally, the exposure potential by all routes is stated based on quantity of material present and toxicity.

Table 3-1. Project activities and associated hazards.

Activity or Task	Associated Hazards or Hazardous Agent
Mobilization/Demobilization	Industrial safety hazards Walking on uneven work surfaces Heavy equipment for site preparation Heat or cold stress Repetitive motion/lifting Caught between/pinch points Noise
Drilling activities; soil, water and rock sampling; geophysical logging	Overhead power lines/obstructions Suspended loads/overhead hazards Working at heights Walking on uneven work surfaces Industrial safety hazards Heat or cold stress Sprains/strains Slips/trips/falls Open borehole Repetitive motion/lifting Caught between/pinch points Confined space entry Noise Radiological and inorganic contaminants
Well and instrumentation installation	Industrial safety hazards Walking on uneven work surfaces Suspended loads/overhead hazardsHeat or cold stress Sprains/strains Slips/trips/falls Repetitive motion/lifting Caught between/pinch points Open borehole Silica flour inhalation Noise Radiological and inorganic contaminants
Equipment decontamination	Industrial safety hazards Walking on uneven work surfaces Heat or cold stress Sprains/strains Caught between/pinch points Noise Radiological and inorganic contaminants

Table 3-2. Contaminants and maximum concentration levels.

Contaminants in unconsolidated soil, interbed sediments, and basalts

Contaminant	Maximum Concentration Level
Gross alpha activity	up to about 25 picocuries/gram (pCi/g)
Gross beta activity	up to about 25 pCi/g
Sr-90	up to about 800 pCi/g
Am-241	-
Cs-137	-
Eu-154	-
Pu-238	-
Pu-239/240	-
Pu-241	-
U-235	-

Contaminants in perched water

Contaminant	Maximum Concentration Level
Iodine-129	trace levels
Sr-90	up to about 100,000 picocuries/liter (pCi/L)
Tritium	up to about 25,000 pCi/L
Technetium	up to about 736 pCi/L
Cs-137	-
Pu	-
Mercury	23 mg/kg
Nitrate	35.4 mg/L
Chloride	250 mg/L
Manganese	165 μg/L
Iron	324 μg/L

Contaminants in SRPA groundwater

Contaminant	Maximum Concentration Level
Tritium	up to about 30,000 pCi/L
Sr-90	up to about 20 pCi/L
Iodine-129	up to about 1 pCi/L
Technetium-99	up to about 20 pCi/L
Pu-238	-
Pu-239	-
Pu-240	-
Chromium and mercury	trace levels

Table 3-3. Evaluation of inorganic and radiological contaminants.

Material or Chemical (CAS No.)	Exposure Limit[a] (PEL/TLV)	Routes of Exposure [b]	Symptoms of Overexposure[c] (Acute and Chronic)	Target Organs/System	Carcinogen (source)[d]	Exposure Potential[e] (all routes without regard to PPE)
Metals and Inorganic Compounds						
Bentonite (sodium bentonite) 7631-86-9	ACGIH 10 mg/m^3 (inhalable) 3 mg/m^3 (respirable)	Ih, Con	Mucous membrane and respiratory tract irritation	Lungs	No	Moderate-high potential (used for well completion)
Silica, Crystalline 14808-60-7	ACGIH 0.05 mg/m^3 (respirable dust)	Ih, Con	Pulmonary fibrosis, silicosis	Respiratory, eyes	Yes (ACGIH: A2, NIOSH, OSHA, IRAC)	Moderate-high potential Mixing of silica sand and flour for well completion
Silica, Crystalline quartz 14808-60-7	OSHA 10 mg/m^3 / (%SiO_2+2) (respirable dust)	Ih, Con	Pulmonary fibrosis, silicosis	Respiratory, eyes	Yes (ACGIH: A2, NIOSH, OSHA, IRAC)	Moderate-high potential Mixing of silica sand and flour for well completion
Chromium Metal (7440-47-3)	ACGIH TLV - 0.5 mg/m^3	Inh, Ing, Con	Irritation of eyes and skin, lung fibrosis (historogic)	Eyes, skin, respiratory tract	No	Low potential
Mercury (7439-97-6)	ACGIH TLV - 0.025 mg/m^3	Inh, Ing, Con, Abs	Irritation eyes, skin; cough, chest pain, dyspnea, bronchial pneumonitis; tremor, insomnia, irritability, indecision, headache, fatigue, weakness; gastrointestinal disturbance, anorexia, low weight	Eyes, skin, respiratory tract, central nervous system, kidneys	No	Low potential
Radiological Contaminants. The dominant radioisotopes are tritium and strontium-90						
Ionizing radiation (internal and external whole body exposure)	INEEL- 0.7 rem/yr person TEDE ALARA dose limit-per RWP or ALARA task Posting of radiation areas per INEEL RCM	Whole body	No symptoms expected	Blood forming cells, GI tract, and rapidly dividing cells	Yes	Low potential Low doses from repeated handling of sample cores and from handling water samples

a. American Conference of Governmental Industrial Hygienists (ACGIH) 2004 TLV Booklet and OSHA 29 CFR 1910 substance specific standards.
b. (Inh) inhalation; (Ing) ingestion; (Abs) skin absorption; (Con) contact hazard.
c. (nervous system) dizziness/nausea/lightheadedness; (dermis) rashes/itching/redness; (respiratory) respiratory effects; (eyes) tearing/irritation;
d. If yes, identify agency and appropriate designation (ACGIH A1 or A2; NIOSH; OSHA; IARC; NTP).
e. Estimates (~) of specific compounds from Tables 3-2 and 3-3.

ALARA = as low as reasonably achievable DAC = derived air concentration eV = electron volts GI = gastrointestinal IARC = International Agency for Research on Cancer
IE = ionization energy NTP = National Toxicology Program PEL = permissible exposure limit RCM = Radiological Control Manual
RWP Radiological Work Permit TEDE = total effective dose equivalent TLV = threshold limit value
MSDSs for these chemicals are available at the OU 3-13 vadose zone trailer.

3.2 Routes of Exposure

Exposure pathways for hazardous materials and radionuclides are directly related to the nature of the project tasks. The exposure pathways for the radionuclides are described below. Engineering controls (e.g., high-efficiency particulate air filtration), continuous monitoring, training, and work controls will mitigate potential contact and uptake of these hazards; however, the potential for exposure to contaminants still exists.

Exposure pathways include

- Inhalation of radionuclide-contaminated fugitive dusts during intrusive activities and decontamination tasks. This contamination form may have trace amounts of inorganic compounds with radionuclides, resulting in potential lung deposition.

- Skin absorption and contact with radionuclides and inorganic compounds during exposure potential, which can be absorbed through unprotected skin or corrosion, resulting in chemical burns, uptake through skin absorption and/or skin contamination, and type of work will be described in the SWP or RWP.

- Ingestion of radionuclides and inorganic compounds adsorbed to dust particles or waste residues exposure potential, uptake of contaminants through the gastrointestinal (GI) tract that result in GI irritation, internal tissue irradiation, and/or deposition to target organs, and type of work will be described in the SWP or RWP.

- Injection while handling radionuclides and inorganic compounds by breaking of the skin, or migration through an existing wound, resulting in localized irritation, contamination, uptake of soluble contaminants, and deposition of insoluble contaminants.

3.3 Environmental and Personnel Monitoring

The potential for exposure to radiological, chemical, and physical hazards exists during many of the tasks that will take place during the OU 3-13 Post-ROD Vadose Zone Monitoring and Aquifer Drilling project and affects all personnel who work in the contamination reduction zone (CRZ) and exclusion zone (EZ). Site Control and Security (Section 8), engineering and administrative controls, worker training, and the use of protective equipment will mitigate most of these hazards to a large degree. Monitoring with direct-reading instruments may be conducted to provide Radiological Control (RadCon) and industrial hygiene (IH) personnel with real-time data to assess the effectiveness of these controls.

The greatest exposure potential(s) for the project will be described in the RWP. The IH and RadCon personnel will focus on the activities and monitor with direct-reading instrumentation, swipes, and full and partial period air sampling in accordance with the applicable TPRs, written for the project, and/or other guidelines, as deemed appropriate. Other workers and areas of the site will also be monitored to verify the integrity of core sample packages, to ensure that contamination has not migrated from radionuclide-contaminated material areas or waste containers, and to determine the effectiveness of contamination control and decontamination practices. Engineering controls will be instituted to control dust at the ground surface to eliminate the potential for exposure to nuisance dust, silica dust, and dust containing radiological contamination.

Personnel working on the project may be exposed to hazardous materials or hazardous physical agents, as already described. Safety hazards and other physical hazards will be monitored and controlled, as outlined in Section 3.4.

3.3.1 Industrial Hygiene Monitoring

When there is a potential for the spread of contamination during the drilling process or work associated with the drilling process, characterization monitoring for surface radionuclide contamination may provide an additional indicator of non-radiological hazards. Various direct-reading instruments and other semiquantitative detection tests may be used to determine the presence of nonradiological and other physical agents. The frequency and type of sampling and monitoring will be determined by changing site conditions, direct-reading instrument results, observation, and professional judgment.

All full and partial-period airborne contaminant sampling will be conducted using applicable NIOSH or OSHA methods and in conformance to company procedures. Risk assessments for work-site personnel will be conducted according to MCP-153, "Industrial Hygiene Exposure Assessment," and PRD-1003, "General Requirements," Section 3.4, "Exposure Monitoring."

3.3.1.1 Industrial Hygiene Instrument and Equipment Calibration. All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations and existing IH protocol and in conformance to applicable company polices and procedures. Direct-reading instruments will be calibrated, at a minimum, prior to daily use and more frequently, as determined by the project IH. Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded, as described in Section 13.

3.3.2 Radiological Monitoring

During this project, the potential exists for exposure to both external and internal radiation (inhalable, ingestible, or absorbed radioactive contaminants). As with the nonradiological contaminants discussed above, the greatest potential for both external and internal radiation exposures will be described in the RWP and/or work order. Monitoring will be performed in accordance with the applicable company polices and procedures.

Based on the unique and distinctive hazards presented by both external and internal radiation sources, they will be evaluated, controlled, and monitored individually (although the detection of any radionuclides will serve to alert for the presence of both). For purposes of this monitoring section, they will be discussed separately and distinguished by their effects as radiation (external) and contamination (internal). Radiological monitoring will include area, airborne, equipment, and personnel monitoring. These data will be used by RadCon personnel to evaluate the effectiveness of engineering controls, ensure the adequacy of work zone boundaries, alert project personnel to potential high radiation sources, and ensure the effectiveness of decontamination methods and practices.

3.3.3 Radiological Engineer and Industrial Hygiene Exposure Assessments

Although the potential for exposure to site contaminants is anticipated to be low for this project, action levels for suspected radiological contaminants are established and presented in Table 3-4 to prevent and mitigate potential personnel exposure. If action levels are reached, personnel will take the appropriate actions listed in Table 3-4. Non-radiological action levels in Table 3-4 are limited to noise exposure.

Table 3-4. Action levels and associated responses for anticipated project hazards.

Contaminant/Agent Monitored	Action Level	Response Taken if Action Levels Exceeded
Hazardous noise levels	<85 dBA 8-hour TWA <84 dBA 10-hour TWA <83.2 dBA 12-hour TWA	No action
	85–114 dBA	Hearing protection is required to attenuate to below 85 dBA 8-hour TWA, 84 dBA for 10-hour TWA, or 83.2 dBA for a 12-hour TWA (based device NRR).
	(a) >115 dBA (b) >140 dBA	(a) Isolate source, evaluate NRR for single device, double protection, as needed. (b) Control entry, isolate source, wear only approved double protection.
Radiation field	<5 mrem/hr	No action, no posting is required.
	5–100 mrem/hr @ 30 cm (§835.603.b)	Post as "Radiation Area." Required items include radiation worker I training or II training, RWP, personal dosimetry.
	>100 mrem – 500 Rad @ 100 cm (§835.603.b)	Post as "High Radiation Area." Required items include RW II training, RWP, alarming personal dosimetry, dose rate meter, and temporary shielding, as required.
	Exceed remote air monitor alarming set point, if required (fast ringing bell, flashing red light)	Evacuate area immediately, muster at CRZ and await instruction from RCT.
Radionuclide contamination	1–100 times company determined limits (§835.603.d)	Post as "Contamination Area." Required items include RW II training, personal dosimetry, RWP, PPE, bioassay submittal, as required.
	>100 times company determined limits (§835.603.d)	Post as "High Contamination Area." Required items include RW II training, personal dosimetry, RWP (with prejob briefing), PPE, bioassay submittal, as required.
Airborne radioactivity	Concentrations (μCi/cc) >30% of DAC value (§835.603.d)	Post as "Airborne Radioactivity Area." Required items include RW II training, personal dosimetry, RWP (with prejob briefing), PPE, bioassay submittal, as required.
	Exceed continuous air monitor alarming set point, (fast ringing bell, flashing red light)	If not in Level B respiratory protection, evacuate upwind to CRZ, await RCT. If in Level B respiratory protection, leave immediate area to upwind location, maintain airline connection and await RadCon instructions.

TWA = time-weighted average
dBA = decibel A-weighted
NRR = Nuclear Reactor Regulation

3.4 Physical Hazards Evaluation, Control, and Monitoring

The physical hazards present at the project area and the methods that will be used to monitor and control them are described in this section. It is critical that all personnel are aware and understand the nature of the tasks to be conducted, the equipment to be used, and the controls to be in place to eliminate or mitigate potential safety hazards.

3.4.1 Temperature Hazards

Project tasks will be conducted during times when there is a potential heat and cold stress that could present a potential hazard to personnel. The HSO will be responsible for obtaining meteorological information to determine if additional heat or cold stress administrative controls are required. All project personnel must understand the hazards associated with heat and cold stress and take preventive measures to minimize the effects. Applicable company policies and procedures guidelines will be followed when determining work-rest schedules or when to halt work activities due to temperature extremes. Subcontract personnel are required to follow PRD-2107, "Heat and Cold Stress."

3.4.1.1 Heat Stress. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort, unconsciousness, to death. In addition, tasks requiring the use of protective equipment or respiratory protection prevent the body from cooling. Personnel must inform the field team leader (FTL) or HSO when experiencing any signs or symptoms of heat stress or observing a fellow employee (i.e., buddy) experiencing them. Heat stress stay times will be documented on the Pre-Job Briefing Form, or other by the HSO when personnel wear PPE that may increase heat body burden. These stay times will take into account the amount of time spent on a task, the nature of the work (i.e., light, moderate, or heavy), type of PPE worn, and ambient work temperatures. Table 3-5 lists heat stress signs and symptoms of exposure.

3.4.1.2 Low Temperatures and Cold Stress. Personnel will be exposed to low temperatures during fall and winter months or at other times of the year if relatively cool ambient temperatures combined with wet or windy conditions exist.

Additional cold weather hazards may exist from working on snow- or ice-covered surfaces. Slip, fall, and material-handling hazards are increased under these conditions. Every effort must be made to ensure walking surfaces are kept clear of ice. The FTL or HSO should be notified immediately if slip or fall hazards are identified at the project locations. Cold stress stay times will be documented on the daily pre-job briefing when effective chill temperatures reach 20° F or lower during the work shift per MCP-2704, "Heat and Cold Stress," and PRD-2107, "Heat and Cold Stress." Personnel should cover all exposed skin for effective chill temperatures at or below -25° F.

3.4.1.3 Ultraviolet Light Exposure. Personnel exposed to ultraviolet light (UV) (i.e., sunlight) while conducting project tasks are reminded to protect themselves from sunlight. Sunlight is the main source of UV known to damage the skin and potentially cause skin cancer. The amount of UV exposure depends on the strength of the light, the duration of exposure, and the level of skin protection. Since UV rays present a potential hazard, the following mitigative actions are recommended to minimize UV exposure:

- Wear clothing to cover the skin (long pants [no shorts] and long-sleeve or short-sleeve shirt [no tank tops])
- Use a sunscreen with a minimum sun protection factor (SPF) of 15

- Wear a brimmed hat (hard hat where required)
- Wear UV-absorbing safety glasses
- Limit exposure during peak intensity hours of 10 a.m. to 4 p.m. whenever possible.

Table 3-5. Heat strain disorders with signs and symptoms associated heat stress.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating.	Keep the skin clean, change all clothing daily, and cover affected areas with powder containing cornstarch or with plain cornstarch.
Heat cramps	Severe muscle cramps and exhaustion, sometimes with dizziness or periods of faintness.	Move the patient to a nearby cool place. Give the patient half-strength electrolytic fluids; if cramps persist, or if signs that are more serious develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; cold, clammy skin; heavy perspiration; total body weakness; dizziness that sometimes leads to unconsciousness.	Move the patient to a nearby cool place, keep the patient at rest, give the patient half-strength electrolytic fluids, treat for shock, and seek medical attention. Do not leave person alone. DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT.
Heat stroke	Deep, then shallow, breathing; rapid, strong pulse, then rapid, weak pulse; hot dry skin; red in color, dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching.	Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Soak clothes in cool water. Seek medical attention as rapidly as possible. Do not leave person alone. Monitor the patient's vital signs constantly. DO NOT ADMINISTER FLUIDS OF ANY KIND.

Note: Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. The FTL or designee should immediately request an ambulance (777, 526-1515 , or 9-911 from cell phones) be dispatched from the Central Facilities Area (CFA) -1612 medical facility and the individual cooled as described above in Table 3-5 based on the nature of the heat stress illness.

3.4.2 Inclement Weather Conditions

When inclement or adverse weather conditions develop that may pose a threat to persons or property at the project site (e.g., sustained strong winds 25 mph or greater with gusts at or in excess of 35 mph, electrical storms, heavy precipitation, or extreme heat or cold), conditions will be evaluated and a decision made by the HSO with input from other personnel to halt work, employ compensatory measures, or proceed. The FTL and HSO will comply with INEEL MCPs and facility work control documents that specify limits for inclement weather.

3.4.3 Noise

Personnel working at the task site may be exposed to noise levels that exceed 85 decibels (dBA) for 8-hour time weighted average (TWA) and 84 dBA for 10-hour TWA, and 83.2 dBA for 12-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued

- Physical damage to the ear, pain, and temporary or permanent hearing loss
- Interference with communication that would warn of danger.

Noise measurements will be performed by the IH per the applicable company polices and procedures to determine if personnel assigned to the jobs identified are above allowable noise exposure levels. A threshold–limit value (TLV) of 85 dBA (TWA) will be applied to personnel exposed to noise levels over no more than an 8-hour day. This level is based on a 16-hour "recovery" period in a low noise environment. If personnel are required to work longer than 8 hours in a hazardous noise environment, then the TLV will be adjusted to a lower value. The project IH must be consulted regarding extended work periods. The TLV of 85 dBA TWA for an 8-hour shift will change to 84 dBA TWA for a 10-hour shift and to an 83.2 dBA TWA for at 12-hour shift.

Personnel, whose noise exposure meets or exceeds the allowable level, will be enrolled in the INEEL Occupational Medical Program (OMP) or subcontractor Hearing Conservation Program. Personnel working on jobs that have noise exposures greater than 85 dBA (or equivalent for adjusted 10-and 12-hour work shifts), will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the IH until directed otherwise.

Individuals having experienced a permanent threshold shift should wear hearing protection at noise levels of 80 dBA or greater. Drilling operations are noisy and all exposed persons should take hearing conservation seriously.

3.4.4 Fire, Explosion, and Reactive Materials Hazards

Fire, explosion, and reactive materials hazards at the task site include potential explosive atmospheres, combustible materials near ignition sources (hot motor or exhaust system), transfer and storage of flammable or combustible liquids in the support zone (SZ), and chemical reaction (reduction, oxidation, exothermic reaction) from incompatible waste materials. Portable fire extinguishers with a minimum rating of 10A/60BC will be strategically located at the site to combat Class ABC fires. They will be located in all active work areas, on or near site equipment with exhaust heat sources, and near all equipment capable of generating ignition or having the potential to spark. All project field team members will receive fire extinguisher training, as necessary, as part of this HASP training, as listed in Section 7, Table 7-1.

3.4.4.1 Project Equipment Fire Hazards. Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. The project fire protection engineer will identify these sources as equipment is brought on the site. The accumulation of combustible materials will be strictly controlled during the project. Disposal of combustible materials will be assessed at the end of each shift. Class A combustibles such as trash, cardboard, rags, wood, and plastic will be properly disposed in metal receptacles in the SZ and in appropriate waste containers within the contamination reduction corridor (CRC), CRZ, and EZ.

Fuels that will be used at the task site for equipment will be safely stored, handled, and used. Only Factory Mutual/Underwriters Laboratories-approved flammable liquid containers, labeled with the content, will be used to store fuel. All fuel containers will be stored at least 15 m (50 ft) from any facilities (trailers) and ignition sources or stored inside an approved flammable storage cabinet. Additional requirements are provided in applicable company polices and procedures. Portable motorized equipment such as generators and light plants will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions prior to refueling to minimize the potential for a fuel fire. Refueling tasks will only be conducted by qualified fuel handling personnel.

3.4.5 Biological Hazards

The INEEL is located in an area that provides habitat for various rodents, insects, and vectors (i.e., organisms that carry disease-causing microorganisms from one host to another). The potential exists for encountering nesting materials or other biological hazards and vectors. The Hantavirus may be present in the nesting and fecal matter of deer mice. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. Contact and improper removal of these materials may provide additional inhalation exposure risks.

If suspected rodent nesting or excrement material is encountered, the industrial hygienist will be notified immediately and **no attempt will be made to remove or clean the area**. Following an evaluation of the area, disinfection and removal of such material will be conducted in accordance with applicable company policies and procedures.

Snakes, insects, and arachnids (e.g., spiders, ticks, and mosquitoes) also may be encountered. Common areas to avoid include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will generally prevent insects from direct contact with the skin. If potentially dangerous snakes or spiders are found or are suspected of being present, warn others, keep clear and contact the industrial hygienist or HSO for additional guidance as required.

Insect repellant (DEET or equivalent) may be required. Areas where standing water has accumulated (e.g., evaporation ponds) provide breeding grounds for mosquitoes and should be avoided. In cases where a large area of standing water is encountered, it may be necessary to pump the water out to a declivity (areas other than the evaporation ponds).

3.4.6 Safety Hazards

Industrial safety hazards pose a significant potential threat to personnel who will be performing tasks during this project. Section 6 provides general safe-work practices that must be followed at all times. The following sections describe specific industrial safety hazards and procedures to be followed to eliminate or minimize potential hazards to project personnel.

3.4.6.1 Handling Heavy Objects. During the course of any drilling project, there are numerous tasks that require handling or moving heavy objects. Manual material handling will be minimized through task design and use of mechanical and/or hydraulic lifts, whenever possible.

3.4.6.2 Powered Equipment and Tools. All power equipment and tools will be properly maintained and used by qualified individuals according to the manufacturer's specifications. Applicable company polices and procedures will be followed for all work performed with powered equipment, including powered steam cleaners.

3.4.6.3 Heavy Equipment and Moving Machinery. The hazards associated with the operation of heavy equipment include injury to personnel, equipment damage, and/or property damage. All heavy equipment will be operated in the manner in which it was intended and according to manufacturer's instructions. Only authorized personnel will be allowed in the vicinity of operating heavy equipment and should maintain visual communication with the operator. Work-site personnel will comply with MCP-2745, "Heavy Industrial Vehicles"; PRD-5123, "Motor Vehicle Safety"; and 29 CFR 1910.178, "Powered industrial trucks*." Site personnel working around or near heavy equipment and other moving machinery will comply with PRD-600, "Maintenance Management Requirements," and DOE-STD-1090-2004, "Hoisting and Rigging," as applicable and appropriate.*

Additional safe practices will include

- Ensuring that all heavy equipment has functional backup alarms.
- Prohibiting walking directly in back of or to the side of heavy equipment without the operator's knowledge; all precautions will have been taken prior to moving heavy equipment.
- While operating heavy equipment in the work area, the equipment operator will maintain communication with a designated person responsible for providing direct voice contact or approved standard hand signals; in addition, all site personnel in the immediate work area will be made aware of the equipment operations.
- Keeping all equipment out of traffic lanes and access ways and storing it so as not to endanger personnel at any time.

3.4.6.4 Electrical Hazards/Energized Systems. Electrical equipment and tools, as well as underground lines, may pose shock or electrocution hazards to personnel. Safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. If work on energized systems is necessary, these practices will conform to the requirements in applicable company polices and procedures and Parts I through III of National Fire Protection Association 70E (NFPA 70E). In addition, all electrical work will be reviewed and completed under the appropriate work controls (i.e., HASP, SWPs, work orders).

Before beginning any subsurface penetrations, underground utility clearances will be obtained by contacting telecommunications (526-1688 or 526-2512). Subsurface investigation clearance will be obtained in accordance with applicable company polices and procedures. The requirements for advanced 48-hour notice will be met.

3.4.6.5 Personal Protective Equipment. Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear noise that might indicate a hazard and directions. Also, PPE can increase the risk of heat stress. Work activities at the task site will be modified, as necessary, to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with applicable company polices and procedures. The OU 3-13 Post-ROD Monitoring Project PPE levels for each task are described in Section 6 and listed in Table 6-1 of that section.

3.4.6.6 Decontamination. Decontamination procedures for personnel and equipment are detailed in Section 10. The appropriate applicable company polices and procedures provide additional requirements for chemical and radionuclide decontamination requirements.

Decontamination procedures (Section 12) and applicable company polices and procedures must be followed and the appropriate level of PPE worn during decontamination activities. Project RadCon and IH personnel will follow applicable company polices and procedures, and general IH practices.

3.4.6.7 Inclement Weather Conditions. When inclement or adverse weather conditions develop that may pose a threat to people or property at the task site (such as sustained strong winds 25 mph or greater, electrical storms, heavy precipitation, or extreme heat or cold), these conditions will be evaluated and a decision made by the FTL and STR with input from the HSO, IH, safety engineer (SE), RCT, and other project personnel, as appropriate, to stop work, employ compensatory measures, or to proceed. The FTL and STR will comply with INEEL MCPs and site work control documents that specify limits for inclement weather.

The effects of wind may increase the risks associated with any given work activity. The potential effects of wind should be considered to determine if work should proceed. This includes sustained and/or gusting winds. The following summarizes the requirements for conducting work in windy conditions.

The following activities shall be **discontinued** when winds meet the cited threshold:

Activity	Wind Speed (mph)
Roof sheeting	40
Use of a man-basket (from a crane)	20

The following activities shall be **evaluated** for the continued safe performance of work when winds meet the cited threshold:

Activity	Wind Speed (mph)
Elevated work on power lines	40
General working at heights/scaffolding	40
Material handling	30
Hoisting and rigging	25
Aerial lift activities	25

For the use of any cranes or other similar equipment that may be affected by the wind, the manufacturer's specific criteria for use of the equipment under windy conditions are expected to be followed.

The wind speed should be the maximum wind speed measured in the immediate area of the work activity. If a job area measurement cannot be taken, a wind speed obtained from a facility monitor or from a NOAA station for the site can be used.

The task may need to be stopped at lower wind speeds than those presented above, depending on an evaluation conducted by the responsible job supervisor and/or industrial safety professional. Their evaluation would consider such factors as blowing dust and debris, the type of material being handled, working at heights, and potential hazards to other workers in the area. Allowing work to continue should be based on whether additional precautions are necessary and can be implemented to protect employees from the hazardous effects of the wind.

3.4.6.8 Dust Control. Each of the four wells will be drilled in potentially radiologically contaminated soil. Dust control is imperative to maintain radiological inhalation exposures well below established limits. This will require a negative pressure enclosure over the well borehole and the drill stem as visible dust will cause operations to shut down until complete dust control is obtained.

Soil from the cyclone must be emptied into waste containers without creating dust exposure to adjacent workers. This may require the use of a tent or climate control enclosure under slight negative pressure covering the cyclone and waste container to eliminate potential dust exposure. The subcontractor is responsible for the control of dust during drilling operations.

3.5 Other Site Hazards

Site personnel should continually look for potential hazards and immediately inform the FTL or HSO of the hazards so that action can be taken to correct the condition.

The FTL, HSO, RCT, and STR will conduct daily inspections of the task site to ensure that barriers and signs are being maintained, unsafe conditions are corrected, and debris is not accumulating on the site. These inspections will be noted in the FTL logbook. Health and safety engineers present at the task site may, at any time, recommend changes in work habits to the FTL. However, all changes that may affect the project written work control documents (HASP, RWPs, SWPs) must have concurrence from the appropriate project technical discipline representative on-Site and a data analysis report must be prepared, as required.

Personnel working at the task site are responsible for using safe-work techniques, reporting unsafe working conditions, and exercising good personal hygiene and housekeeping habits throughout the course of their job.

3.5.1 Material Handling and Back Strain

Material handling and maneuvering of various pieces of equipment may result in employee injury. All lifting and material-handling tasks will be performed in accordance with applicable company policies and procedures. Personnel will not physically lift objects weighing more than 22 kg (50 lb) or 33% of their body weight (whichever is less) alone.

Additionally, back strain and ergonomic considerations must be given to material handling and equipment usage. Mechanical and hydraulic lifting devices should be used to move materials whenever possible. The industrial hygienist will conduct ergonomic evaluations of various project tasks to determine the potential ergonomic hazards and provide recommendations to mitigate these hazards. Applicable requirements from company policies and procedures will be followed.

3.5.2 Working and Walking Surfaces

Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls. The various work surfaces associated with drilling and sampling activities present inherent tripping hazards because of uneven ground, equipment in use, and metal working surfaces. Additionally, the potential for slip, trip, and fall hazards will increase during winter months because of ice- and snow-covered surfaces combined with objects beneath the snow. During the prejob briefing, all personnel will be made aware of tripping hazards that cannot be eliminated. Tripping and slip hazards will be evaluated during the course of the project in accordance with applicable company policies and procedures.

3.5.3 Elevated Work Areas

Personnel may sometimes be required to work on elevated equipment or at heights above 1.8 m (6 ft). During such work, employees will comply with requirements from 29 CFR 1926 Subpart M and applicable company policies and procedures. Where required, a fall protection plan will be written.

3.5.4 Pressurized Systems

Drilling equipment operated on this project utilizes high pressure air and hydraulic systems. The hazards presented to personnel, equipment, facilities or the environment because of inadequately designed

or improperly operated pressure systems include blast effects, shrapnel, fluid jets, release of toxic or asphyxiant materials, contamination, equipment damage, personnel injury, and death. These systems can include pneumatic, hydraulic, or compressed gas systems. The requirements of applicable company policies and procedures, and the manufacturer's operating and maintenance instructions must be followed. This includes inspection, maintenance, and testing of systems and components in conformance with American National Standards Institute (ANSI), Compressed Gas Association, etc.

All pressure systems will be operated in the designed operating pressure range, which is typically 10 to 20% less than the maximum allowable working pressure. Additionally, all hoses, fittings, lines, gauges, and system components will be rated for the system for at least the maximum allowable working pressure (generally the relief set point). All high-pressure air lines and fittings shall be provided with whip checks at connection points to prevent lines from whipping in the event of failure. The project HSO should be consulted about any questions of pressure systems in use at the project site.

3.5.5 Illumination

Planned work hours for the 2005 well installation may include six 24-hour days split into two 12-hour shifts 6 days per week. Both shifts will experience darkness and will have to provide supplemental lighting adequate to perform the task and without major shading problems. Work in low-light conditions will require supplemental lighting in compliance with 29 CFR 1926.56 and PRD-1003, "General Requirements," Section 3.3, "Illumination."

3.5.6 Shift Work

Personnel assigned to the 2005 well installation project may be subjected to working 6 days per week in 12-hour shifts. An additional daily commute time of 2 hours is anticipated. Thus, the subcontract drill crew and FTLs (geologists) could be subjected to six 14-hour days per week. Stresses from these work hours include sleep deprivation, fatigue, loss of appetite, and the potential to fall asleep at the wheel during the 2-hour daily commute period. Worker rotation will be utilized to help lessen the number of work hours per week and number of work hours per day.

3.5.7 Confined Spaces

A confined space is a space that (a) is large enough and so configured that an employee can bodily enter and perform assigned work; and (b) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited entry); and (c) is not designed for continuous employee occupancy.

Work in confined spaces may subject workers to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres. Entrance into a fracture tank (Frac Tank) and possibly a waste box/bag may be necessary during well installation/well sampling activities. The tank/box/bag are all open top and they are anticipated to be non-permit confined space (NPCS) per MCP-2749, "Confined Spaces," and/or PRD-2110, "Confined Spaces." A hazard identification and evaluation shall be conducted and documented on Form 442.09, "Confined Space Identification and Hazard Evaluation Form," for each confined space to be entered that does not exist on the facility confined space inventory.

3.5.7.1 Non-permit Confined Spaces. A NPCS is a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any recognized, serious safety or health hazard capable of causing death or serious physical harm.

A work control document may be used to address specific measures and precautions to be taken by employees to enter a NPCS. Atmospheric testing may be waived for NPCSs if such spaces are properly ventilated before and during occupancy or if it has been established through a formal hazard identification and evaluation that no atmospheric hazards exist and the ventilation is sufficient to guard against development of a hazardous atmosphere.

A standby person should be used to provide standby assistance to employees entering non-permit spaces when deemed appropriate by a qualified person. Ensure all personnel entering or serving as alternates in non-permit space entry receive confined space entry pre-job briefing to review appropriate roles, responsibilities, entry procedures, and precautions. The pre-job briefing satisfies the training requirements for entry into non-permit spaces. A courtesy notification shall be provided to the INEEL Fire Department for all non-permit confined space entries.

If atmospheric levels are tested and are not within acceptable limits after implementation of engineering controls, then the entry shall not proceed. Request an evaluation to reclassify the space as permit-required and implement applicable requirements.

All qualified persons or trained testers performing confined space atmospheric testing receive "Confined Space Atmospheric Testing" (00TRN 448) training. If a change of condition introduces new hazards to the space, the space shall be immediately evacuated and shall be reevaluated before entry or reentry.

3.5.7.2 Permit-Required Confined Spaces. The evaluation will include a completed "Confined Space Entry Permit." Fire department notification is required before authorizing entry, as they will be on standby during all entry activities to support and perform rescue operations. A trained attendant will be outside the confined space to assist entrants, monitor the well-being of entrants, and maintain communication with the rescue team, if necessary. Personnel required to enter the space will be briefed on the hazards involved, the meaning of warning signals of any monitoring equipment that is worn or taken into the space, any special tools or equipment to be used, and actions to take if an emergency occurs. The emergency rescue plan is outlined below.

Atmospheric testing and monitoring must be completed in permit-required confined spaces. If atmospheric levels are tested and are not within acceptable limits after implementation of engineering controls, then the entry shall not proceed. All qualified persons or trained testers performing confined space atmospheric testing receive "Confined Space Atmospheric Testing" (00TRN 448) training. If a change of condition introduces new hazards to the space, the space shall be immediately evacuated and shall be reevaluated before entry or reentry.

All confined space training will be verified by the FTL or STR. The entrant(s)/attendant(s) and supervisor must have course codes that meet the requirements identified in MCP-2749, "Confined Spaces," and/or PRD-2110, "Confined Spaces."

3.5.7.3 Emergency Rescue Plan. For permit-required confined spaces, an emergency rescue plan will be completed as part of the work control documentation. The plan shall include the number and type of rescue equipment (for example, harnesses, lanyards, or tripod/winch) that will be used by entrants and/or maintained at the project, where the equipment will be staged or set up to facilitate a rescue, and specific assignments of rescue personnel. Personnel using rescue equipment must be trained to a "competent" level as defined in MCP-2749, "Confined Spaces," and/or PRD-2110, "Confined Spaces." The detailed rescue plan shall be developed in conjunction with the INEEL Fire Department.

3.6 Drilling Hazards

Air rotary drilling (or equivalent) will be used to drill to the required depths. Drilling personnel will be aware of potential drilling equipment hazards and body positioning during all material handling tasks. Specific hazards associated with drill rigs are described below. Additional hazards and mitigation information is described in the current project Well Drilling and Sampling JSA which must be followed by persons conducting drilling, monitoring, and sampling activities under this HASP.

Drill rig and well maintenance activities shall be in compliance with PRD-312[a] for all associated activities conducted by the contractor and subcontractor.

3.6.1 Excavation, Surface Penetrations, and Outages

Excavation activities conducted in conjunction with drilling activities are considered ground penetrations. All surface penetrations and related outages will be coordinated through the and will require submittal of an outage request for outages (e.g., road, electrical, and water). The submission of an outage request will not be considered an approval to start the work. Other specific outage requirements are addressed in the special conditions section of the management and operating contract. No surface penetrations will be allowed or conducted until the area has been evaluated and an approved subsurface evaluation documented.

All excavation activities will be conducted and monitored in accordance with applicable company policies and procedures and 29 CFR 1926, Subpart P, "Excavations." The following are some key elements from these requirements:

- The location of utility installations (e.g., sewer, telephone, fuel, electric, water lines, or any other underground installations) that may reasonably be expected to be encountered during excavation work will be determined before opening an excavation.

- Structural ramps that are used solely by employees as a means of access or egress from excavations will be designed by a competent person. Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design and will be constructed in accordance with the design. Structural ramps will be inspected in accordance with applicable company forms.

- Employees exposed to public vehicular traffic will be provided with and will wear warning vests or other suitable garments marked with or made of reflecting or high-visibility material.

- Daily inspections of excavations, areas adjacent to the excavations, and protective systems will be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection will be conducted by the competent person before the start of work and as needed throughout the shift. Inspections also will be made after every rainstorm or other hazard-increasing occurrence.

- Sloping or benching will be constructed and maintained in accordance with the requirements set forth in 29 CFR 1926, Subpart P, Appendixes A and B, for the soil type as classified by the

[a] PRD-312, "Drill Rig and Well Maintenance Safety," in preparation.

competent person. This classification of the soil deposits will be made based on the results of at least one visual inspection and at least one manual analysis.

3.6.2 Slips

Slips are toothed wedges positioned between the drill pipe and the master bushing of rotary cable to suspend the drill string in the well bore when it is not supported by the hoist. Most accidents, associated with slip operation are related to manual material handling; strained backs and shoulder strain.

3.6.3 Elevators

Elevators are a set of clamps affixed to the bails of the swivel below the traveling block. They are clamped to each side of a drill pipe and hold the pipe as it is pulled from the well bore. Accidents and injuries can occur during the latching and unlatching tasks; fingers and hands can get caught and crushed in the elevator latch mechanism. If the pipe is overhead when the latching mechanism fails, pipe may fall on workers on the drill floor.

3.6.4 Catlines/Hoist Lines

Catlines are used on drilling rigs to hoist material. Accidents that occur during catline operations may injure the worker doing the rigging, as well as the catline operator. Minimal control over hoisting materials can cause sudden and erratic load movements, which may result in hand and foot injuries.

3.6.5 Working Surfaces

The rig floor is the working surface for most tasks performed in well drilling operations. The surface is frequently wet from circulating fluid, muddy cuttings, and water used or removed from the borehole during drilling operations. Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls.

3.6.6 Material Handling

The most common type of accident that occurs during material handling is when a load is being handled and a finger or toe is caught between two objects. Rolling stock can shift or fall from a pipe rack or truck bed. Fingers and hands can be caught between sampling barrels, breakout vices, and tools.

3.6.7 High-Pressure Lines

A high-pressure diversion system will be used to carry cuttings away from the borehole. All high-pressure lines will be equipped with positive locking connectors (e.g., cams) and be secured with properly rated whip checks in case of a connection failure. The project safety professional will be consulted about the rating and proper placements of whip checks or equivalent restraining devices.

3.6.8 Overhead Objects

Personnel may be exposed to falling overhead objects, debris, or equipment or impact hazards during the course of the project from drilling and well installation activities. Sources for these hazards will be identified and mitigated in accordance with applicable company policies and procedures. In the case of overhead impact hazards, they will be marked by using engineering-controls protective systems where there is a potential for falling debris, in combination with head protection PPE.

3.6.9 Hoisting and Rigging of Equipment

All hoisting and rigging of the materials during well installation, maintenance, and drilling activities will be performed in accordance with applicable company policies and procedures and DOE-STD-1090-2004 "Hoisting and Rigging," as applicable for this project. Hoisting and rigging equipment will show evidence of a current inspection (e.g., tag) and be inspected before use by qualified personnel. Additionally, the operator or designated person for mobile cranes or boom trucks will perform a visual inspection each day or before use (if the crane has not been in regular service) of items such as, but not limited to, the following:

- All control mechanisms for maladjustment that would interfere with proper operation
- Crane hooks and latches for deformation, cracks, and wear
- Hydraulic systems for proper oil level
- Lines, tanks, valves, pumps, and other parts of air or hydraulic systems for leakage
- Hoist ropes for kinking, crushing, birdcaging, and corrosion
- All anti-two-block, two-block warning, and two-block damage prevention systems for proper operation.
- Administrative control procedures developed by the INTEC Facility shall be followed for applicable hoisting and rigging activities.

Note: The operator or other designated person will examine deficiencies and determine whether they constitute a safety hazard. If deficiencies are found, they will be reported to the safety professional.

3.6.10 Rotating Equipment

The drill stem rotates on a drill rig and remains unguarded during drill operations. Personnel working on or adjacent to the drill stem must remain aware of the rotating shaft and continuously be aware of its presence. Driller helpers shall ensure they wear no loose clothing that could become caught in rotating equipment. Personnel shall keep extremities from being caught between rotating equipment and adjacent stationary equipment.

3.6.11 Boreholes

All unattended boreholes shall be adequately covered or protected to prevent personnel from falling or slipping into hole. Cover/guard well openings and boreholes prior to moving drill rig, service rig, or boom truck if possible. Personnel working adjacent to open boreholes in excess of 12 in. shall use effective means of barricading or guarding to prevent personnel from falling into the hole.

3.6.12 Ascending/Descending Ladder

All rig steps, ladders, stairways, platforms, and walkways shall be free of mud, snow, ice, tools, and other materials that may cause slipping or tripping. When performing drill rig repair or maintenance, subcontract personnel may use permanent ladders attached to equipment or portable extension ladders placed on level footing and secured to prevent accidental dislodgement. All ladders shall be inspected

prior to use to ensure they are in proper working condition and unsafe conditions, such as ice or slippery conditions, are not present. Portable ladders shall extend a minimum of 36 in. above the access level and be secured near the top for safe access/egress. Fixed ladders shall be accessed once inspected to ensure they are in good working condition, that is, free of slipping hazards and defects. Personnel accessing fixed ladders shall be afforded fall protection at or above 6 ft from the adjacent level and shall maintain three-point contact minimally at all times. Materials will be raised/lowered by use of rope or other approved methods. Employee training shall address the following subjects as applicable:

- Fall hazards in the work area
- Correct procedures for erecting, maintaining, and disassembling the fall protection system to be used
- Proper construction, use, placement, and care in handling ladders
- Maximum load-carrying capacities of ladders used
- Standards governing ladder use.

3.6.13 Wind Loading on the Drill Rig Mast

The HSO will consult with the safety engineer to determine whether wind loading on the drill rig poses a potential safety hazard. The drill rig manufacturer design specifications and American National Standards Institute and American Petroleum Institute Specification 4F, "Specification for Drilling and Well Servicing Structures" (API 1995) will be used as the basis for determining safe design loading and limitations.

3.7 Site Inspections

Project personnel may participate in site inspections during the work control preparation stage (such as the hazard identification and verification walkdowns), conduct self-assessments or other inspections. Additionally, the HSO, project manager, or FTL will perform periodic safety inspections in accordance with applicable company policies and procedures.

Targeted or required self-assessments may be performed during investigation and sampling operations in accordance with applicable company policies and procedures. All inspections and assessments will be documented and available for review by the FTL. These inspections will be noted in the FLT logbook. Health and safety professionals present at the task site may, at any time, recommend changes in work habits to the FTL.

4. EXPOSURE MONITORING AND SAMPLING

A potential for exposure to radiological, chemical, and physical hazards exists during project tasks including well installation and routine sampling activities which may affect all personnel who work on the OU 3-13 Post-ROD Vadose Zone Monitoring and Aquifer Drilling project. Site Control and Security (Section 8) describes the use of engineering and administrative controls, worker training, and wearing PPE to provide the mitigation strategy for these hazards. Monitoring and sampling will be used during project tasks to (1) assess the effectiveness of these controls, (2) determine the type of PPE needed for individual tasks, and (3) determine the need for upgrading and downgrading of PPE as described in Section 6. Monitoring with direct-reading instruments will be conducted as deemed appropriate to provide RadCon and IH personnel with real-time data to assess the effectiveness of control measures.

Table 4-1 lists the tasks and hazards to be monitored, the frequency, and the monitoring instruments. Table 4-2 lists the action levels and associated responses for specific hazards.

4.1 Exposure Limits

Exposure limits are identified in Table 3-3 for specific project tasks. Project tasks will be continually assessed in accordance with applicable company policies and procedures and evaluated by RadCon and IH personnel to ensure engineering control effectiveness. Action limits should be adjusted as required based on changing site conditions, exposure mitigation practices, and PPE levels.

4.2 Action Limits

Action limits are one-half or 50% the exposure limits identified in Table 3-4 to serve as the initial limits for specific operations. Monitoring results at or above an action limit, identified through exposure monitoring, will initiate additional evaluations including consideration for improved engineering controls, administrative controls, reevaluation of personal protective equipment, and probable need for additional exposure monitoring based on the industrial hygienist's recommendations. Action limits may be adjusted based on changing site conditions, exposure mitigation practices, and PPE levels.

4.3 Environmental and Personnel Monitoring

RadCon and IH personnel will conduct initial and periodic monitoring with direct-reading instruments, collect swipes, and conduct full- and partial-period air sampling, as deemed appropriate, in accordance with the applicable TPRs, MCPs, OSHA substance-specific standards, and as stated on work permits and other guidelines. Instrumentation listed on Table 4-1 will be selected based on the site-specific conditions and contaminants associated with project tasks. The RCT and IH will be responsible for determining the best monitoring technique for radiological and non-radiological contaminants respectively. Safety hazards and other physical hazards will be monitored and mitigated as outlined in Section 1.

Table 4-1. Tasks and hazards to be monitored, frequency, and monitoring instruments.

Tasks	Hazard(s) to be Monitored	Instrument Category to be Used	Instrument Category #	Monitoring Instruments Description[a,b]
Well drilling and instrument placement, repair, removal	Ionizing radiation—(beta, gamma)	1	1	(Beta-gamma) Dose rate Eberline Model RO-20 or equivalent.
	Radionuclide contamination—(alpha, beta, gamma)	1a		
	Airborne radionuclide contamination	2	1a	(Alpha) Count rate— Ludlum 3 (Ludlum 43-5 alpha scintillator probe) or equivalent.
	Chemical constituents—organic vapors, lead, cadmium	3, 4		(Beta-gamma) Count rate— Ludlum 3 (HP 260 probe) or equivalent.
	Respirable dust—silica (area and personal)	3, 5		
	Hazardous noise	6	2	Continuous air monitor (CAM)—ALPHA 6-A-1 or equivalent (as required). CAM (beta)—AMS-4 or equivalent (as required). Grab sampler—SAIC H-810 or equivalent (as required).
	Ergonomics, repetitive motion, lifting	7		
	Heat and cold stress	8		
Well sampling activities	Ionizing radiation—(alpha, beta, gamma)	1		
	Radionuclide contamination—(alpha, beta, gamma)	1a	3	(Organic vapor) Direct reading instruments (photoionization detector, flame ionization detector, or infrared detector) detector tubes or grab samples.
	Respirable dust—silica (area)	4, 5		
Wastewater transfer/handling operations	Ionizing radiation—(alpha, beta, gamma)	1		(Dust) Direct-reading instrument (miniram).
	Radionuclide contamination—(alpha, beta, gamma)	1a		
	Airborne radionuclide contamination	2		
	Chemical constituents—organic vapors, lead	3, 4	4	(Organic vapors and lead) Personal sampling pumps with appropriate media for partial and full period sampling using NIOSH or OSHA-validated methods.
	Respirable dust—silica (area and personal)	3, 5		
	Hazardous noise	6		
	Ergonomics, repetitive motion, lifting	7		
	Heat and cold stress	8	5	(Silica dust, respirable) NIOSH 7500 (NIOSH 2003) or equivalent, personal sampling pump, 10-mm cyclone, full-period sampling.
	Radionuclide contamination—(alpha, beta, gamma)	2		
	Respirable dust—silica (area)	4, 5		

Table 4-1. (continued).

Tasks	Hazard(s) to be Monitored	Instrument Category to be Used	Instrument Category #	Monitoring Instruments Description[a,b]
Heavy equipment operations	Respirable dust—silica (area and personal)	4, 5	6	ANSI Type S2A sound level meter or ANSI S1.25-1991 dosimeter (A-weighted scale for time-weighed average dosimetry, C-weighted for impact dominant sound environments).
	Hazardous noise	6		
	Ergonomics, repetitive motion, lifting	7		
Decontamination of equipment	Radionuclide contamination—(alpha, beta, gamma)	1a		
	Airborne radionuclide contamination	2	7	Observation and ergonomic assessment of activities in accordance with applicable company policies and procedures, and American Conference of Governmental Industrial Hygienists threshold limit value.
	Chemical constituents—organic vapors, lead, cadmium	3, 4		
	Hazardous noise	6	8	Heat stress—wet-bulb globe temperature, body weight, fluid intake.
	Ergonomics, repetitive motion, lifting	7		
	Heat and cold stress	8		Cold stress—ambient air temperature, wind chill charts.

a. Monitoring and sampling will be conducted as deemed appropriate by project Industrial Hygiene and Radiological Control personnel based on specific tasks and site conditions.
b. Equivalent instrumentation other than those listed may be used.

Table 4-2. Action levels and associated responses for the perched water project hazards.

Contaminant/Agent Monitored	Action Level		Response Taken If Action Levels Are Exceeded	
Nuisance particulates (not otherwise classified)	>10 mg/m^3 (inhalable fraction) >3 mg/m^3 (respirable fraction)		Move personnel to upwind position of source and close equipment cab windows and doors. Use wetting or misting methods to minimize dust and particulate matter. IF wetting or misting methods prove ineffective, THEN don respiratory protection[a] (as directed by industrial hygienist).	
Hazardous atmosphere	As defined by applicable company policies and procedures or based on one-half or 50% of the individual contaminant exposure limit, lower explosive limit (LEL), oxygen content, etc.		1. Measure atmosphere prior to initiating operation or personnel entry and verify specific limit or condition has been met (e.g., <LEL). 2. Utilize engineering controls to maintain safe atmosphere/below specified limit. 3. IF engineering control fails to control contaminant below safe atmospheric/exposure limit, THEN stop operation and evacuate personnel until safe atmosphere/specified limit can be achieved.	
Silica (respirable fraction)	Greater than or equal to the OSHA permissible exposure limit of $\frac{10 \text{ mg/m}^3}{\%\text{silica} + 2}$ (29 CFR 1910.1000 [Z3])		Move personnel to upwind position of source. Use wetting or misting methods to minimize dust and particulate matter during mixing. IF wetting or misting methods prove ineffective, THEN don respiratory protection[a] (as directed by industrial hygienist).	
Hazardous noise levels	<85 decibel A-weighted (dBA) 8-hour time-weighted average (TWA), <83dBA 10-hour TWA		No action.	
	85 to 114 dBA		Hearing protection required to attenuate hazard to below 85 dBA 8-hour TWA, 84 dBA for 10-hour TWA, or 83.2 dBA for 12-hour TWA (device noise reduction rating [NRR]).	
	(a) >115 dBA	(b) >140 dBA	(a) Isolate source, evaluate NRR for single device, double protection as needed.	(b) Control entry, isolate source, only approved double protection worn.
Radiation field	<5 mrem/hour		No action, no posting required.	
	5 to 100 mrem/hour @ 30 cm (10 CFR 835.603.b)		Post as "Radiation Area"—Required items: Radiological Worker I or II training, Radiological Work Permit (RWP), personal dosimetry.	
	>100 mrem to 500 Rad @ 100 cm (10 CFR 835.603.b)		Post as "High Radiation Area"—Required items: RW II, RWP, alarming personal dosimetry, dose rate meter, and temporary shielding (as required).	

Table 4-2. (continued).

Contaminant/Agent Monitored	Action Level	Response Taken If Action Levels Are Exceeded
Radionuclide contamination	1 to 100 times company determined limits[b] (10 CFR 835.603.d)	Post as "Contamination Area"—Required items: RW II training, personal dosimetry, RWP, don personal protective equipment (PPE), bioassay submittal (as required).
	>100 x company determined limits[b] (10 CFR 835.603.d)	Post as "High Contamination Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, bioassay submittal (as required).
Airborne radioactivity	Concentrations (μCi/cc) >30% of and derived air concentration value (10 CFR 835.603.d)	Post as "Airborne Radioactivity Area"—Required items: RW II training, personal dosimetry, RWP (with prejob briefing), don PPE, bioassay submittal (as required).

a. Level C respiratory protection will consist of a full-face respirator equipped with a high-efficiency particulate air filter cartridge as prescribed by the project IH and RadCon personnel (based on contaminant of concern). See Section 5 for additional Level C requirements.
b. The project radiological engineer and/or the RCT will define company limits.

4.3.1 Industrial Hygiene Area and Personal Monitoring and Instrument Calibration

The project industrial hygienist will conduct full- and partial-period sampling of airborne contaminants and monitoring of physical agents at a frequency deemed appropriate based on direct-reading instrument readings and changing site conditions. When conducted, all air sampling will be conducted using applicable National Institute of Occupational Safety and Health (NIOSH), OSHA, or other validated method. Both personal and area sampling and monitoring may be conducted.

Various direct-reading instruments may be used to determine the presence of nonradiological and other physical agents. The frequency and type of sampling and monitoring will be determined by changing site conditions, direct-reading instrument results, observation, professional judgment, and in accordance with the applicable company policies and procedures.

All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations, existing Industrial Hygiene protocol, and in conformance with the companywide safety and health manuals. Direct reading instruments will be calibrated, at a minimum, before daily use and more frequently as determined by the project industrial hygienist. Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded as stated in Section 13.

4.3.2 Area Radiological Monitoring and Instrument Calibration

Area radiological monitoring will be conducted during project tasks to ensure that personnel are given adequate protection from potential radiological exposure. Instruments and sampling methods listed in Table 4-1 may be used by the RCT as deemed appropriate and as required by project or task-specific RWPs. When conducted, monitoring will be performed in accordance with applicable company manuals. The data obtained from monitoring will be used by RadCon personnel to evaluate the effectiveness of engineering controls, decontamination methods and procedures, and alert personnel to potential radiation sources.

As applicable, RadCon personnel will utilize radiation and contamination detectors and counters to provide radiological information to project personnel. Daily operational and source checks will be performed on all portable survey instruments to ensure they are within the specified baseline calibration limits. Accountable radioactive sources will be maintained in accordance with MCP-137, "Radioactive Source Accountability and Control." All radiological survey and monitoring equipment will be maintained and calibrated in accordance with the manufacturer's recommendations and existing RadCon protocol, in conformance to MCP-93, "Health Physics Instrumentation," and in accordance with 10 CFR 835.703(d), "Other monitoring records."

4.3.2.1 External Dosimetry. Dosimetry requirements will be based on the radiation exposure potential during project tasks. When dosimetry is required, all personnel who enter the project area will be required to wear personal dosimetry devices, as specified by RadCon personnel and the RWP, and in accordance with the applicable company manuals.

When RWPs are required for project tasks, the Radiological Control and Information Management System (RCIMS) will be used to track external radiation exposures to personnel. Individuals are responsible for ensuring all required personal information is provided to RadCon personnel for entry into RCIMS and logging into RCIMS when electronic dosimeters are used.

4.3.2.2 Internal Monitoring. The purpose of internal dose monitoring is to demonstrate the effectiveness of contamination control practices and to document the nature and extent of any internal uptakes that may occur. Internal dose evaluation programs will be adequate to demonstrate compliance with 10 CFR 835, "Occupational Radiation Protection." The requirement for whole body counts and bioassays will be based on specific project tasks or activities and will be the determination of the radiological engineer. Bioassay requirements will be specified on the RWP and project personnel will be responsible for submitting required bioassay samples upon request.

5. ACCIDENT AND EXPOSURE PREVENTION

Project activities will present numerous safety, physical, chemical, and radiological hazards to personnel conducting these tasks. It is critical that all personnel understand and follow the site-specific requirements of this HASP. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will be implemented to eliminate or mitigate potential hazards and exposures, where feasible. However, all personnel are responsible for the identification and control of work area hazards in accordance with Integrated Safety Management System (ISMS) principals and practices. **At no time will hazards be left unmitigated without implementing some manner of controls (e.g., engineering controls, administrative controls, or the use of PPE)**. Project personnel shall use stop work authority in accordance with applicable company policies and procedures where it is perceived that immanent danger to personnel, equipment, or the environment exists.

This HASP is to be used in conjunction with applicable company policies and procedures. Where appropriate, applicable company policies and procedures, mitigation guidance, JSAs, and RWPs will be incorporated into applicable sections of the HASP.

5.1 Voluntary Protection Program and Integrated Safety Management

The INEEL safety processes embrace the Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Project personnel are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents, procedures, and permits.

The **ISMS** is focused on the **system** side of conducting operations and **VPP** concentrates on the **people** aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards and additional information on these programs is available on the INEEL Intranet. BBWI (current primary management and operating contractor) and its subcontractors participate in VPP and ISMS for the safety of their employees. This document includes all elements of both systems. The five key elements of VPP and ISMS and their corresponding HASP sections are as follows:

Voluntary Protection Program	Integrated Safety Management System	Health and Safety Plan Section
	Define work scope	Section 2
Work site analysis	Analyze hazards	Section 1, 4, 6, 8
Hazard prevention and control	Develop and implement controls	Section 1, 4, 5, 6, 7, 8, 10, 11, 12,
Safety and health training	Perform within work controls	Section 7
Employee involvement	Perform work within controls	Section 1, 4, 5
Management leadership	Provide feedback and improvement	Section 5, 10

5.2 General Safe-Work Practices

Sections 1 and 2 defined the project work scope and associated project-specific hazards with mitigation. The following practices are mandatory for all project personnel to further reduce the likelihood of accidents and injuries. All visitors permitted to enter work areas must follow these requirements. Failure to follow these practices may result in permanent removal from the project and other disciplinary actions. The project FTL and HSO will be responsible for ensuring the following safe-work practices are adhered to at the project site(s):

- Limit work area access to authorized personnel only, in accordance with applicable company policies and procedures and Section 7 of this document.
- All personnel have the authority to initiate STOP WORK actions in accordance with applicable company policies and procedures.
- Personnel will not eat, drink, chew gum or tobacco, smoke, apply sunscreen, or perform any other practice in CERCLA areas of in areas where there is an increased probability of hand-to-mouth transfer and ingestion of work areas contaminants.
- Be aware of and comply with all safety signs, tags, barriers, and color codes as identified in accordance with applicable company policies and procedures.
- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and spills that may be present. Report all potentially dangerous situations to the FTL or HSO.
- Avoid direct contact with hazardous materials and waste. Personnel will not walk through spills or other contamination areas and will avoid kneeling, leaning, or sitting on equipment or potentially contaminated surfaces.
- Be familiar with the physical characteristics of the INTEC Facility, including, but not limited to:
    - Prevailing wind direction
    - Location of fellow personnel, equipment, and vehicles
    - Communications at the project site and with INTEC or CFA
    - Area and the type of hazardous materials stored and waste disposal materials
    - Major roads and means of access to and from the project site
    - Location of emergency equipment
    - Warning devices and alarms at INTEC and/or CFA
    - Capabilities and location of nearest emergency assistance.
- Report all broken skin or open wounds to the operations manager, FTL, or HSO. An OMP physician must examine all wounds to determine the nature and extent of the injury. If required to enter into a radiological contamination area, a RadCon supervisor will determine whether the wound can be bandaged adequately in accordance with applicable company manuals.

- Prevent releases of hazardous materials. If a spill occurs, personnel must try to isolate the source (if possible and if this does not create a greater exposure potential) and then report it to the FTL, or HSO. The Warning Communications Center (WCC) and INTEC shift supervisor will be notified and additional actions will be taken, as described in Section 11. Appropriate spill response kits or other containment and absorbent materials will be maintained at the project site

- Illumination levels during project tasks will be in accordance with 29 CFR 1910.120 (Table H-120.1, "Minimum Illumination Intensities in Foot-Candles").

- Ground-fault protection will be provided whenever electrical equipment is used outdoors.

- Keep all ignition sources at least 15 m (50 ft) from explosive or flammable environments and use nonsparking, explosion-proof equipment when working on systems containing flammable or explosive liquids, gases, and vapors.

- Follow all safety and radiological precautions and limitation of TPRs and requirements identified in work packages.

5.3 Subcontractor Responsibilities

Subcontractors are responsible for meeting all applicable requirements listed in the completed, applicable company forms, policies, and procedures as well as manuals, and contract general and special conditions. Additionally, subcontractor are expected to take a proactive role in hazard identification and mitigation while conducting project tasks and report unmitigated hazards to the project point of contact and HSO after taking mitigative actions within the documented work controls.

5.4 Radiological and Chemical Exposure Prevention

Exposure to potential chemical, radiological, and physical hazards will be mitigated by using of engineering controls, administrative controls, and PPE as a last means of defense to prevent and minimize exposure where engineering controls are not feasible. All project personnel are responsible for understanding the hazard identification and mitigation measures necessary to prevent exposures.

5.4.1 Radiological Exposure Prevention – As Low as Reasonably Achievable Principles

Radiation exposure of project personnel will be controlled such that radiation exposures are well below regulatory limits and that there is no radiation exposure without commensurate benefit. **Unplanned and preventable exposures are considered unacceptable.** All project tasks will be evaluated with the goal of eliminating or minimizing exposures. All project personnel have the responsibility for following as-low-as reasonably achievable (ALARA) principles and practices and personnel working at the site must strive to keep both external and internal radiation doses.

5.4.2 Chemical and Physical Hazard Exposure Avoidance

Note: Identification and control of exposures to carcinogens will be conducted in accordance with applicable company policies and procedures.

TLVs or other occupation exposure limits have been established for numerous chemicals and physical agents (e.g., noise, heat, or cold stress) that may be encountered. These exposure limits provide guidelines in evaluating airborne, skin, and physical agent exposures. The TLVs represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects. The TLV-TWA is a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects. Action limits (instantaneous concentrations for short time periods) have been established (Section 1) to further reduce the likelihood of exceeding TLVs.

Controls will be employed to eliminate or mitigate chemical and physical hazards wherever feasible. The hierarchy of controls in order are (1) engineering controls, (2) administrative controls, and (3) PPE. In addition to these controls, use of technical procedures and work orders, hold points, training, and monitoring of hazards will be used as appropriate to reduce exposure potential. Some methods of exposure avoidance include:

- Wearing all required PPE, inspecting all pieces before donning, and taping all seams
- Changing PPE if it becomes damaged or shows signs of degrading
- Minimizing time in direct contact with both hazardous material and waste
- Doff PPE following standard practices (i.e., rolling outer surfaces in and down) and follow doffing sequence
- Wash hands and face before eating, drinking, smoking, or engaging in activities that may provide contaminant pathways.

5.5 Buddy System

The two-person or buddy system will be used during project tasks. The buddy system is most often used during project activities requiring the use of protective clothing and respiratory protection where heat stress and other hazards may impede a person's ability to self-rescue. The buddy system requires each employee to assess and monitor his or her buddy's mental and physical well being during the course of the operation. A buddy must be able to perform the following activities:

- Provide assistance if required
- Verify the integrity of PPE
- Observe his or her buddy for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the area if emergency assistance is needed.

The buddy system will be administered by the FTL in conjunction with the HSO.

6. PERSONAL PROTECTIVE EQUIPMENT

This section provides guidance for the selection and use of PPE to be worn for project tasks and contingencies for upgrading and downgrading PPE. Types of PPE are generally divided into two broad categories: (1) respiratory protective equipment and (2) PPE. Both of these categories are incorporated into the standard four levels of protection (Levels A, B, C, and D). Level D PPE is anticipated for all aspects of this project.

The purpose of personal protective clothing and equipment is to shield or isolate individuals from chemical, physical, radiological, biological, and safety hazards encountered during project tasks when engineering and other controls are not feasible or cannot provide adequate protection. It is important to realize that no one PPE ensemble can protect against all hazards under all conditions. Proper work practices and adequate training will serve to augment PPE usage to provide the greatest level of worker protection.

The PPE policy requires field workers wear, as a minimum, sturdy leather boots above the ankles, safety glass with side shields, and hard hats which is classified as level D. Safety boots will be required for activities where objects, materials, or equipment have the potential to fall on the feet of workers, occasional workers, visitors, and inspectors. The project HSO or safety professional will determine where and when this requirement will be invoked for each project.

The type of PPE will be selected, issued, used, and maintained in accordance with applicable company policies and procedures. Selection of the proper PPE is based on the following considerations:

- Specific conditions and nature of the tasks including well equipment installation, well monitoring, and well maintenance activities
- Potential contaminant routes of entry
- Physical form and chemical characteristics of hazardous materials, chemicals, or waste
- Toxicity of hazardous materials, chemicals, or waste
- Duration and intensity of exposure (acute or chronic)
- Compatibility of chemical(s) with PPE materials and potential for degradation or breakthrough
- Environmental conditions (e.g., humidity, heat, cold, rain)
- The hazard analysis (Section 1) evaluation of this HASP.

The PPE requirement for specific project tasks is identified in Table 6-1. This list may be augmented by the activity JSA and/or RWP. Potential exposures and hazards will be monitored (as discussed in Section 1) during the course of the project to evaluate changing conditions and determine PPE level adequacy and modifications.

Table 6-1. Task-based PPE requirements and modifications.

Task	Initial Level of Personal Protective Equipment	Upgrade Contingency	Downgrade Contingency	Upgrade or Downgrade Criteria	Personal Protective Equipment Modifications and Comments
Well drilling and instrument placement, repair, removal	D	C	D	Upgrade to Level C if airborne concentrations exceed action limits. Downgrade to Level D if contact with waste containers can be avoided or surveys show no detectable contamination on surfaces.	Level C respiratory protection defined by industrial hygienist, based on airborne contaminant. Leather gloves for all material handling tasks.
Well sampling activities	D	D+	N/A	Upgrade to Level D+ when attaching or removing straps if contamination is detected on the outside of waste containers.	D+ protective clothing consists of Tyvek hooded coveralls (or equivalent). Leather gloves.
Wastewater transfer/handling operations	D	D+	N/A	Upgrade to Level C if airborne levels exceed action limits. Downgrade to Level D if contact with waste containers can be avoided or surveys show no detectable contamination on surfaces.	Level C respiratory protection defined by industrial hygienist, based on airborne contaminant. Leather gloves for all material handling tasks.
Heavy equipment operations	D	D+	N/A	Upgrade to Level D+ if contact with waste material cannot be avoided.	D+ protective clothing consists of Tyvek hooded coveralls (or equivalent). Leather gloves.
Site grading	D	D+	N/A	Upgrade to Level C if airborne concentrations exceed the action limits.	Level C respiratory protection defined by industrial hygienist, based on airborne contaminant. Level C protective clothing consists of Tyvek hooded coveralls (or equivalent). Leather gloves for all material handling tasks.

Table 6-1. (continued).

Task	Initial Level of Personal Protective Equipment	Upgrade Contingency	Downgrade Contingency	Upgrade or Downgrade Criteria	Personal Protective Equipment Modifications and Comments
Equipment decontamination	C	C+	D+	Upgrade to Level C+ if splashing during decontamination of lead, cadmium, radiologically contaminated equipment cannot be avoided. Downgrade to Level D+ for decontamination of small items using spray and wipe decontamination methods.	Level C respiratory protection defined by industrial hygienist, based on airborne contaminant. Level C protective clothing consists of Tyvek (or equivalent) hooded coverall. Level C+ protective clothing consists of Saranex (or equivalent coated hooded coverall). Leather gloves over nitrile for equipment and material handling before or after decontamination tasks. Double pair nitrile gloves during decontamination tasks.

6.1 Respiratory Protection

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be selected and used.

Required task-based respiratory protection and protective clothing are listed on Table 6-1. Respirators will not be required for specific project tasks. All personnel required to wear respirators will complete training and be fit-tested before being assigned a respirator in accordance with the training and documentation requirements in Section 6. Requirements for respirator use, emergency use, storage, cleaning, and maintenance, as stated in the applicable company policies and procedures, will be followed.

6.2 Personal Protective Equipment Levels

Table 6-2 lists PPE requirements for the two levels of PPE that may be worn during the course of the project. Applicable PPE levels include level D and Level C PPE which will be required for conducting project tasks. Modifications to these levels will be made under the direction of the HSO in consultation with the project IH and RadCon personnel, as appropriate. Such modifications are routinely employed during Hazardous Waste Operations and Emergency Response (HAZWOPER) site activities to maximize efficiency and to meet site-specific needs without compromising personnel safety and health. Level D PPE is the anticipated level of protection for project activities and will be upgraded if warranted by the presence of contaminants above action limits.

6.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected for protective clothing and not on a site with respiratory or skin absorption hazards requiring whole-body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against surface contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized as having limited contamination hazards.

6.2.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site chemical and radiological contaminants have been well-characterized indicating that personnel are protected from airborne exposures by wearing an air-purifying respirator with the appropriate cartridges, no oxygen-deficient environments exist (less than 19.5%), and that there are no conditions that pose immediate danger to life or health.

Table 6-2. Levels and options of PPE.

Personal Protective Equipment Level	PPE Required	Optional Personal Protective Equipment or Modifications
D	Coveralls or standard work clothes (coverall material type based on industrial hygiene determination). Hard hat (unless working indoors with no overhead or falling debris hazards) meeting ANSI Z89.1 requirements. Eye protection (safety glasses meeting ANSI Z87.1 requirements as a minimum). Hand protection (material based on type of work and hazardous materials being handled). Safety footwear (steel or protective toe and shank) meeting ANSI Z41 requirements or sturdy leather above the ankle for construction tasks.	Chemical or radiological protective clothing (Tyvek or Saranex) by industrial hygienist or RCT. Chemically resistant hand and foot protection (e.g., inner and outer gloves and boot liners). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (e.g., hearing protection, cryogenic gloves, face shields, welding goggles, and aprons).
C	Level D ensemble with the following respiratory and whole-body protection upgrades:[a] • Full-facepiece air purifying respirator equipped with a NIOSH-approved high-efficiency particulate air (HEPA) filter or chemical combination cartridge (industrial hygienist to specify cartridge type) **OR** • An air hood operating at a minimum pressure of 6 cfm or a full-facepiece supplied air respirator with a 10-minute escape bottle, a self-contained breathing apparatus (SCBA) or an escape air-purifying combination HEPA or chemical cartridge (supplied air respirator hose length no more manufacturer's specification and under no circumstances greater than 91 m [300 ft]) • Standard Tyvek (or equivalent) coverall **OR** • Chemical-resistant coveralls (e.g., Tyvek QC, Tychem 7500, or Saranex-23-P) (industrial hygienist to specify material).	Chemical-resistant outer shoe or boot cover (industrial hygienist or RCT to specify material). Inner chemical-resistant gloves with cotton liners (as determined by the industrial hygienist and RWP). Outer chemical-resistant gloves (as determined by the industrial hygienist). Radiological modesty garments under outer protective clothing (as required by RWP). Any specialized protective equipment (e.g., hearing protection, welding lens, and aprons).

a. Upgrades are determined by the industrial hygienist in conjunction with other environment, safety, and health professionals.

Note: Personnel must inspect all PPE before donning and entry into any work zone. Items found to be defective or that become unserviceable during use, will be doffed and disposed of in accordance with posted procedures and placed into the appropriate waste stream. The PPE inspection guidance is provided in Table 6-1.

6.3 Personal Protective Clothing Upgrading and Downgrading

The project HSO, in consultation with the project industrial hygienist and RadCon personnel, will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading of PPE based on changing site conditions or activities is a normal occurrence. Action levels listed in Table 3-2 serve as the initial basis for making such decisions. Additional reasons for upgrading or downgrading are listed in the following subsections.

6.3.1 Upgrading Criteria for Personal Protective Equipment

The level of PPE required will be upgraded for the following reasons and work will halt until PPE upgrading has been completed:

- Identification of new, unstable, or unpredictable site hazards
- Temporary loss or failure of any engineering controls
- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Identified source or potential source of respiratory hazard(s) not anticipated
- Change in the task procedure that may result in an increased contact with contaminants or meeting any of the criteria listed above.

6.3.2 Downgrading Criteria

The level of PPE will be downgraded under the following conditions:

- Elimination of hazard or completion of task(s) requiring specific PPE
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate hazard
- Sampling information or monitoring data that show the contaminant levels to be stable and lower than established action limits
- Elimination of potential skin absorption or contact hazards.

6.3.3 Inspection of Personal Protective Equipment

All PPE ensemble components must be inspected before use and when in use within project work zones. Self-inspection and the use of the buddy system, once PPE is donned, will serve as the principle forms of inspection. If PPE should become damaged or degradation or permeation is suspected, the individual wearing the PPE will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable PPE. Table 6-3 provides an inspection checklist for common PPE items. Where specialized protective clothing or respiratory protection is used or required, the manufacturer's inspection requirements in conjunction with regulatory or industry inspection practices will be followed. Consult the project industrial hygienist, safety professional, and RCT about PPE inspection criteria.

Table 6-3. Inspection checklist for personal protection equipment.

Personal Protection Equipment Item	Inspection
Respirators (full-facepiece air-purifying and supplied air respirators with escape-only SCBA bottles or escape cartridges)	Before use: Ensure airline is the appropriate airline for the airline respiratory protection to be used. Inspect airline hose connections (sections of hose) to ensure all are threaded or permanent metal-to-metal connections (no quick disconnect pieces). Check condition of the facepiece, head straps, valves, connecting lines, fittings, and all connections for tightness. Check cartridge to ensure proper type or combination are being used for atmospheric hazards to be encountered, and inspect threads and O-rings for pliability, deterioration, and distortion. Check for proper setting and operation of regulators and valves, check all hose connections back to the breathing-air compressor, check the pressure to the airline station and on individual airline connections to ensure pressure is within required range (in accordance with the manufacturer's specifications).
Level D and C clothing	Before use: Visually inspect for imperfect seams, nonuniform coatings, and tears. Hold PPE up to the light and inspect for pinholes, deterioration, stiffness, and cracks. While wearing in the work zone: Inspect for evidence of chemical attack such as discoloration, swelling, softening, and material degradation. Inspect for tears, punctures, and zipper or seam damage. Check all taped areas to ensure they are still intact.
Gloves	Before use: Pressurize rubber gloves to check for pinholes: blow in the glove, then roll until air is trapped and inspect. No air should escape. Leather gloves: Inspect seams and glove surface for tears and splitting and verify no permeation has taken place.

7. PERSONNEL TRAINING

All INEEL personnel will receive training, as specified in 29 CFR 1910.120 and/or 29 CFR 1926.65 and INEEL companywide manuals, as applicable. Table 7-1 summarizes the project-specific training requirements for personnel-based access requirements, responsibilities at the project site, potential hazards, and training level requirements.

Modifications (e.g., additions to or elimination of) to training requirements listed in Table 7-1 may be necessary based on changing field conditions. Any changes to the requirements listed in Table 7-1 must be approved by the HSO, with concurrence from the FTL, project manager, RCT, and industrial hygienist, as applicable. These changes should be based on site-specific conditions and will generally be considered a minor change to the HASP, as defined by instructions from applicable company forms because they are administrative in nature.

7.1 General Training

All project personnel are responsible for meeting training requirements including applicable refresher training. Evidence of training will be maintained at the project site, field administrative location, or electronically (e.g., Training Records and Information Network [TRAIN] [INEEL 2004]). Nonfield team personnel and visitors must be able to provide evidence of meeting required training for the area of the site they wish to access before being allowed into a project area. **As a minimum**, all personnel who access project locations must receive a site-specific briefing, are required to wear PPE, and must provide objective evidence of having completed INEEL computer-based PPE training (00TRN288, "Personal Protective Equipment") or equivalent, in accordance with 29 CFR 1910, Subpart I, "Personal Protective Equipment." When activities are conducted outside a facility boundary, all personnel must complete unexploded ordinances training.

7.2 Project-Specific Training

Before beginning work at the project site, field team members will receive project-specific HASP training that will be conducted by the HSO (or designee). This training will consist of a complete review of (1) a controlled copy of the project HASP, attachments, and document action requests, (2) applicable JSAs and SWPs (if required), (3) work orders, and (4) other applicable work control and work authorization documents, with time for discussion and questions. Project-specific training can be conducted in conjunction with, or separately from, the required formal prejob briefing applicable company policies and procedures.

At the time of project-specific HASP training, personnel training records will be checked and verified to be current and complete for all the training requirements shown in Table 6-1. After the HSO (or designee) has completed the site-specific training, personnel will sign applicable company forms indicating that they have received this training, understand the project tasks, associated hazards and mitigations, and agree to follow all HASP and other applicable work control and safety requirements. Applicable training forms are available on the INEEL Intranet under "Forms."

Table 7-1. Required project-specific training.

Required Training	Sobcontract Supervisor, Field Team Leader, Health and Safety Officer, Subcontract Technical Representative and Samplers	Subcontract Personnel and Other Field Team Members	Access into the Designated or Controlled Work Area, Construction Area or Contamination Reduction Zone	Access to Project Areas Outside Designated or Controlled Work Area, Construction Area or Support Zone
40-hour hazardous waste operations (HAZWOPER)[a] - operations	Yes	Yes		
24-hour HAZWOPER[b] - operations			Yes	
HAZWOPER supervisor	Yes[c]			
Project-specific health and safety plan training[d]	Yes	Yes	Yes	
Project-site orientation briefing[e]				Yes
Fire extinguisher training (or equivalent)	c	c		
Cardiopulmonary resuscitation, medic first-aid	f	f		
Use of Personal Protective Equipment (00TRN288)	Yes	Yes	Yes	
Hearing conservation	g	g	g	
Hantavirus (SMTT0008)	Yes	Yes		
Heat Stress Training (00TRN606)	Yes	Yes		
Working in Hazardous Temperatures - Cold Stress (SMTT0010)	Yes	Yes		
JSA Training	Yes	Yes	Yes	
Respirator training (contingency only)	h	h	h	
Prejob briefings and postjob reviews (00TRN732)	i	i	i	
Prejob briefing performance evaluation (00TRN754)	c	c		
DOE radiological worker II/ radiological worker I	j	j	j	
Forklift operator	k	k		
Drill rig operator[l]	k	k		

Table 7-1. (continued).

Required Training	Sobcontract Supervisor, Field Team Leader, Health and Safety Officer, Subcontract Technical Representative and Samplers	Subcontract Personnel and Other Field Team Members	Access into the Designated or Controlled Work Area, Construction Area or Contamination Reduction Zone	Access to Project Areas Outside Designated or Controlled Work Area, Construction Area or Support Zone
Vacuum excavator operator[l]	k	k		
Fall protection at-risk-worker	m	m		
Fall protection competent person	n	n		

Note 1: Shaded fields indicate specific training is not required or applicable.
Note 2: Supervised field experience is only required if personnel have not previously completed this training at another CERCLA (42 USC § 9601) site (documented), or they are upgrading from 24- to 40-hour HAZWOPER training. A copy of the training record must be kept at the project site as evidence of training or be available electronically.
Note 3: Completed training project forms should be submitted to the training coordinator for inclusion in the TRAIN system within 5 working days of completion.
a. Includes 8-hour HAZWOPER refresher training as applicable, and supervised field experience as follows: 40-hour HAZWOPER = 24-hour supervised field experience and 24-hour HAZWOPER = 8-hour supervised field experience).

b. 40-hour or 24-hour HAZWOPER training requirement will be determined by the HSO based on the nature of the project tasks and potential for exposure to contaminants or safety hazards.

c. At least one trained person onsite when field team is working and the health and safety officer will determine appropriate number of personnel requiring training.

d. Includes project-specific hazards communications (29 CFR 1910.120), site-access and security, decontamination and emergency response actions, as required by 29 CFR 1910.120(e).

e. Orientation includes briefing of site hazards, designated work areas, emergency response actions, and PPE requirements. Personnel receiving project-site orientation briefing only are limited to the areas outside designated work areas and must be escorted by a project supervisor or designee who is fully trained on the requirements of the HASP.

f. At least two trained individuals to remain onsite during work activities.

g. If entering areas where initial exposure determination indicates exposure above the action limit is possible.

h. Required if entering area requiring respiratory protection (e.g., action levels exceeded or the industrial hygienist/RCT sampling shows respiratory protection required).

i. Includes all attendees of prejob briefings.

j. As required, based on project duties and/or site zone access requirements.

k. Personnel operating specific equipment.

l. Or equivalent as demonstrated by subcontractor.

m. Personnel exposed to heights at or in excess of 6 ft.

n. Minimum one subcontract person to direct/supervise at-risk worker activities.

Note 1: Supervised field experience is only required if personnel have not previously completed this training at another CERCLA (42 USC § 9601) site (documented), or they are upgrading from 24- to 40-hour HAZWOPER training. A copy of the training record must be kept at the project site as evidence of training or be available electronically.

Note 2: Completed training project forms should be submitted to the training coordinator for inclusion in the TRAIN system within 5 working days of completion.

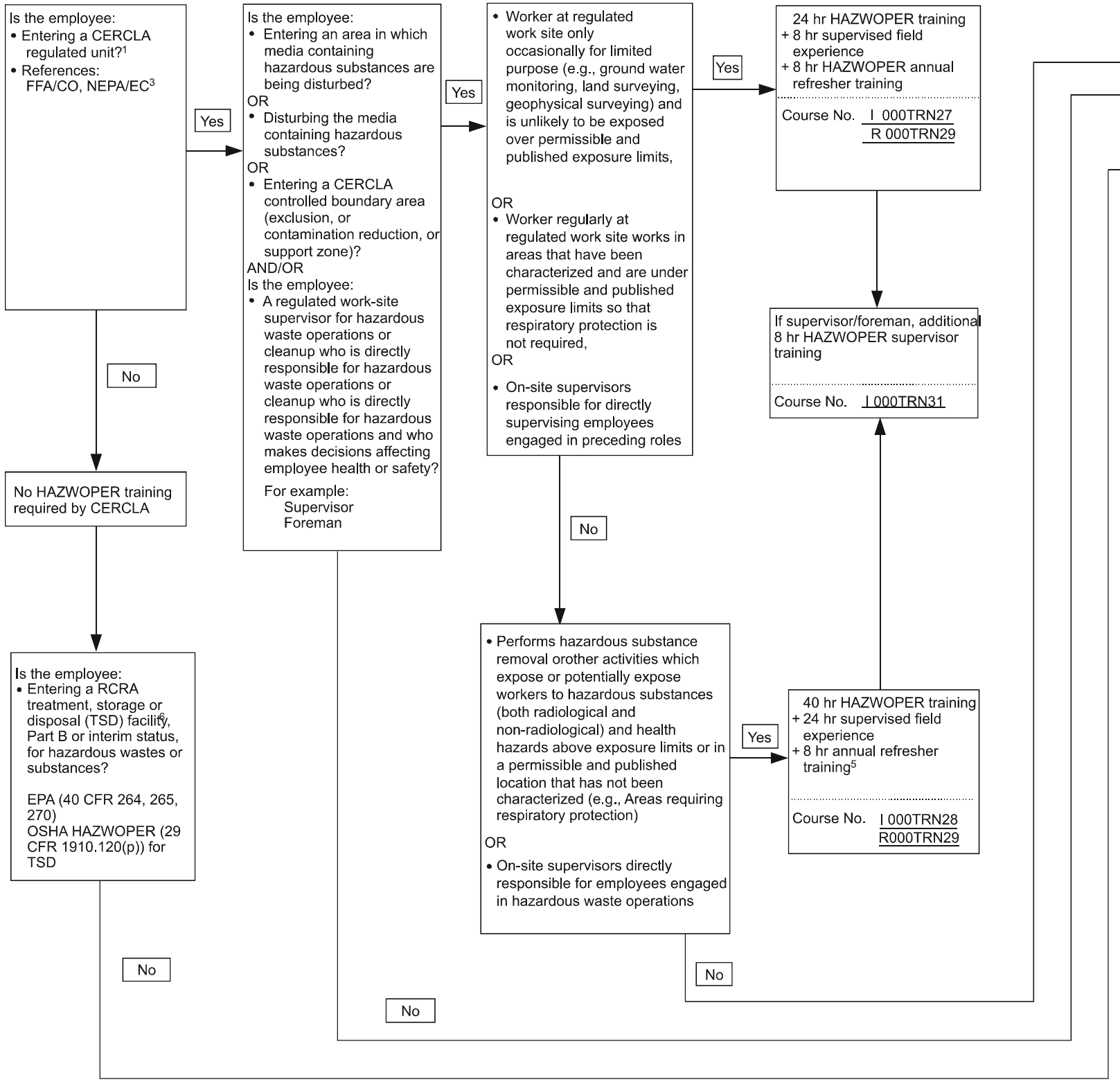
A trained HAZWOPER 8-hour supervisor (FTL or other person who has been trained by the HAZWOPER supervisor) will monitor the performance of each newly 24-hour or 40-hour trained worker to meet the 1 or 3 days of supervised field experience, respectively, in accordance with 29 CFR 1926.120(e). Following the supervised field experience period, the supervisor will complete applicable company forms to document the supervised field experience. Figure 7-1 outlines personnel training requirements at CERCLA sites.

7.3 Plan of the Day Briefing, Feedback, and Lessons Learned

A daily prejob briefing or equivalent meeting will be conducted by the FTL, STR, or designee. During this meeting, daily tasks are to be outlined; hazards identified, hazard controls, mitigation, and work zones established; PPE requirements discussed; and feedback from personnel solicited. At the completion of this meeting, any new work control documents will be reviewed and signed (e.g., SWP, JSA, or RWP).

Particular emphasis will be placed on lessons learned from the previous workday's activities and how tasks can be completed in the safest, most efficient manner. All personnel are encouraged to contribute ideas to enhance worker safety and mitigate potential exposures at the project sites.

Safety and health topic-specific training or safety meetings may also be conducted during the course of the project to reinforce key safety topics. They may be conducted by project safety and the industrial hygienist or any field team member and should be performed in conjunction with the Pre-job briefing. Credit for a safety meeting can be received for such topic-specific training if a tailgate training form or equivalent is completed and submitted to the appropriate training coordinator (within 5 days) for entry into TRAIN.



1 A CERCLA worker who also works on a RCRA/TSD site must also receive site-specific RCRA training and must be trained to the Health & Safety Plan[2] (HASP) and receive orientation to the area.

2 A RCRA employee who also works on a CERCLA site will need additional training.

3 Contact Environmental Affairs Department

4 Comply with written HASP training requirements, if available.

5 16 hr upgrade needed for employees with 24 hr training, Course No. 000TRN69

6 A RCRA employee who also works on aCERCLA site will need additional training if the CERCLA portion of the site is uncharacterized or requires use of a respirator.

7 Likely exposure indicated by:

1. Exposure to hazardous substances or health hazards which require the use of employee personal protective equipment to prevent acute, chronic, or adverse health effects; (this applies to both radiological and non-radiological hazards)
   OR
2. Airborne chemical exposures which meet orexceed established action levels or half the established exposure limits for chemicals which do not have assigned action levels.

Figure 7-1. Model identifying employees requiring HAZWOPER training at CERCLA sites.

8. SITE CONTROL AND SECURITY

Site control and security will be maintained at the project site during all activities to prevent unauthorized personnel from entering the work area. Entry into and exit out of these areas will be controlled through the appropriate use of barriers, signs, and other measures in accordance with applicable company policies and procedures.

The HSO and Safety Professional should be consulted regarding equipment layout at the project site (in conjunction with the Subcontractor Superintendent for subcontractor-owned equipment) to minimize personnel hazards from equipment. The focus should be on equipment with stored energy (electrical, pressurized systems, elevated materials/equipment, chemical), moving and rotating parts (equipment that is guarded and that has open rotating parts such as a drill rig), and other equipment with the potential to result in personnel injuries from being struck-by, caught-between, or entangled in such equipment. The layout at the project site of equipment should reflect the nature of the hazard presented and should be mitigated through the use of engineering controls (barriers, guards, isolation), administrative controls (roped off restricted areas or controlled entry access), and qualifications of operators and those assisting in the operation of the equipment, when required.

Good housekeeping will be maintained at all time during the course of the project to include maintaining working and walking surfaces to minimize tripping hazards, stacking or storing in a centralized location materials and equipment when not in use, and regular cleanup of debris and trash that may accumulate at the project site.

Based on the nature of the project tasks to be completed, a graded approach with two types of site control designations will be used based on the potential hazards, complexity of work tasks, and duration of project tasks. The two types of work areas are

- Controlled work areas (CWAs) established for higher hazard tasks include well installation and well maintenance activities

- A construction area established for all construction tasks at the project site.

The primary differences between the work areas will be the size of the area, method of delineation, and postings as determined by the activity being conducted and associated hazards. The determination of what type of work area will be established will be made by the HSO in conjunction with the FTL and RadCon personnel where radiological concerns exist.

Both radiological and nonradiological hazards (including industrial safety hazards) will be evaluated when establishing the initial work zone size, configuration, and location. Common barriers may be used to delineate both radiological and nonradiological work-zone postings, depending on the nature and extent of contamination. If common barriers are used, they will be delineated and posted in accordance with both sets of requirements (29 CFR 1910.120 and 10 CFR 835), using appropriate colored rope and postings.

Personnel not directly involved with project activities will be excluded from entering these work areas. Visitors may be admitted into work areas provided they are (1) on official business, (2) received site-specific training or orientation by the FTL or designee, and (3) have met all the site-specific training requirements for the area they have a demonstrated need to access (including PPE training), as listed on Table 7-1.

Note: Visitors may not be allowed into controlled work areas during high hazard tasks to minimize risks to workers and visitors. The determination as to any visitor's need for access into the CWA will be made by the FTL in consultation with the HSO and RCT, as appropriate.

8.1 Designated Work Area

The DWAs will consist of the area immediately around the project activity site. This type of work area will be established where a more restrictive designated work area would not lend itself to low hazard task of short duration. The boundary of the DWA will typically be marked with cones or stanchions and generally will not be delineated with rope or ribbon or include other demarcation. All personnel who enter the DWA will wear the appropriate level of PPE for the degree and type of hazards present, as listed in Section 6. All DWAs will be delineated and posted with the appropriate signage based on the hazard being controlled, in accordance with applicable company policies and procedures.

Support facilities and equipment (e.g., project administrative trailer, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment) will generally be located outside the DWA. Visitors who do not have appropriate training or PPE to access the DWA will be restricted from entering.

8.2 Controlled Work Area

The CWAs will be large enough to encompass the equipment and nature of the tasks being conducted to prevent personnel not assigned to the project task and visitors from being exposed to potential safety and health hazards associated with the project tasks. This type of work area will be established where a more restrictive area is required based on increased hazards associated with detected radiation or chemical contamination sites. The boundary of the CWA typically will be marked with a combination of stanchions or posts and delineated with rope or ribbon and include warning signs (e.g., construction area) or other demarcation. Only the minimum number of personnel required to safely perform the project tasks will be allowed into the CWA. The CWA is a controlled area during all project tasks and an entry and exit point will be established at the periphery of the CWA to regulate the flow of personnel and equipment. All personnel who enter the CWA will wear the appropriate level of PPE for the degree and type of hazards present, as listed in Section 6.

Factors that will be considered when establishing the CWA boundary include (1) air monitoring data, (2) equipment in use, and (3) the physical area necessary to conduct site operations. The boundary may be expanded or contracted, as this information becomes available, based on the aforementioned factors. The HSO, in conjunction with the safety professional and industrial hygienist, will establish the CWAs. All CWAs will be delineated and posted with the appropriate signage based on the hazard being controlled in accordance with applicable company policies and procedures.

All CWAs will be delineated and posted with the appropriate signage based on the hazard being controlled and in accordance with applicable company policies and procedures. A typical construction area configuration is identified in Figure 8-1.

Note: The HSO will provide assistance in establishing the access requirements for the truck or heavy equipment traffic routes, designated work areas, and for the project-based equipment in use.

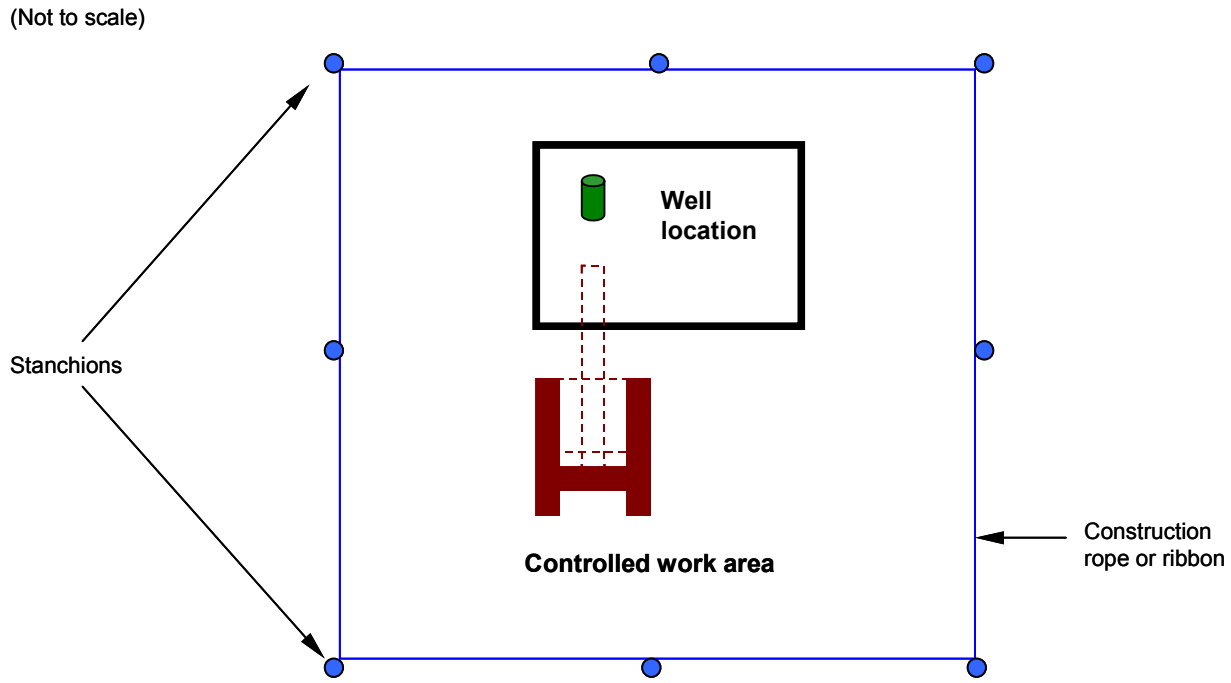


Figure 8-1. Typical configuration of a construction area.

8.3 Exclusion Zone

An EZ will be established when working in CERCLA areas where CERCLA activities are conducted. The EZ will be large enough to encompass the primary task area and to allow equipment and personnel to move about freely and conduct necessary tasks. The minimum number of personnel required to safely perform project tasks will be allowed into the EZ. If the EZ will be relocated to another site or reconfigured, it will be delineated in a configuration large enough to prevent nonfield team personnel in the support zone from being exposed to potential safety and health hazards. The EZ shape and size will be based on the tasks being conducted, existing structures and facilities, and potential for impact to adjacent areas from project tasks or contaminants.

The EZ is a controlled access zone at all times. An entry and exit point will be established at the periphery of the EZ and CRC to regulate the flow of personnel and equipment. The EZ boundary will be delineated with rope or printed hazard ribbon and posted with signs in accordance with applicable company policies and procedures. Figure 8-2 identifies a general work zone diagram where chemical or radiological contamination is anticipated.

Factors that will be considered when establishing the EZ boundary include (1) tasks being conducted, (2) air monitoring data, (3) radiological contamination data, (4) radiation fields, (5) equipment in use, (6) the physical area necessary to conduct site operations, and (7) the potential for contaminants to be blown from the area. The boundary may be expanded or contracted as these factors change or additional monitoring information becomes available. All personnel who enter the EZ will wear the appropriate level of PPE for the hazards present and have required training as listed in Sections 6 and 7 of this HASP, respectively.

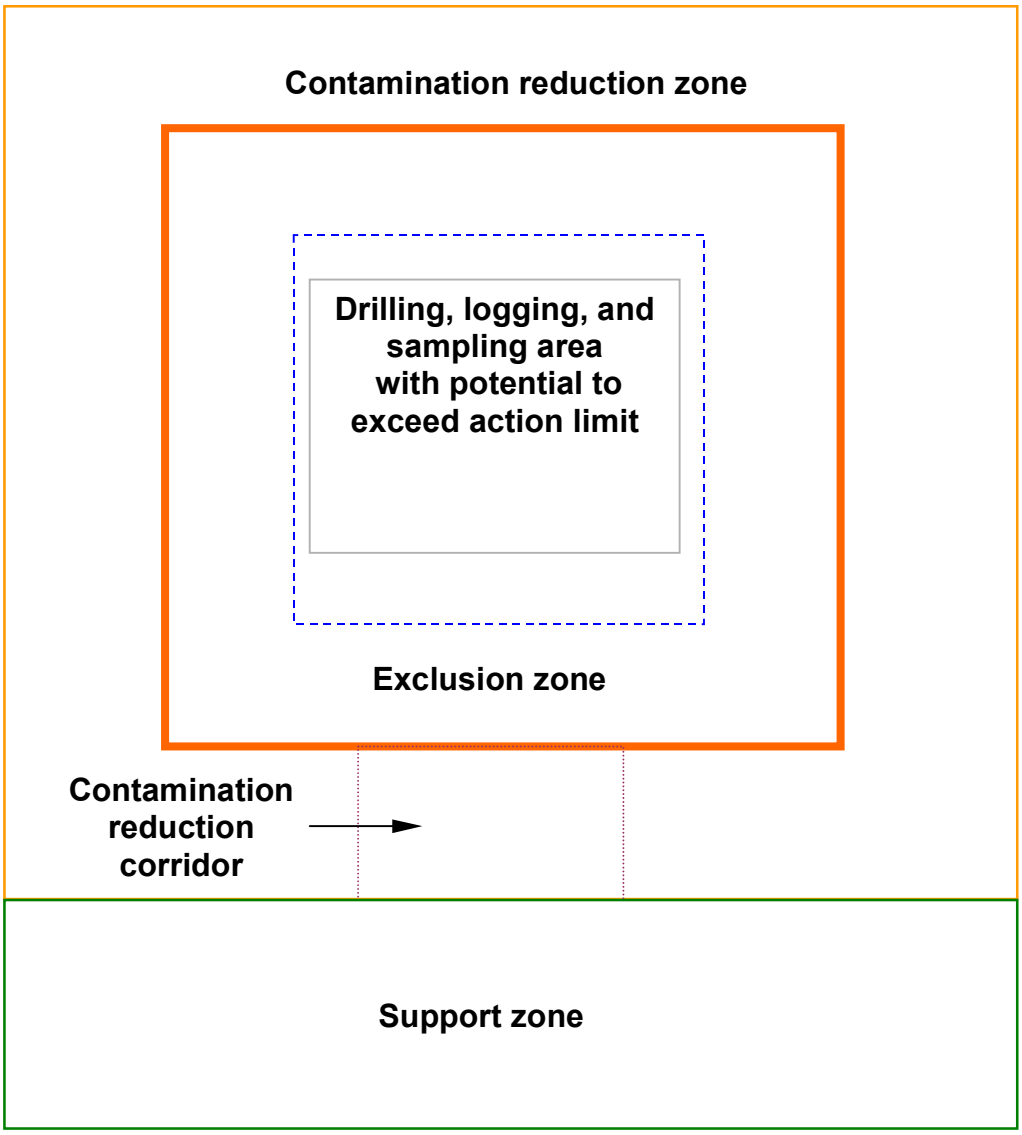


Figure 8-2. General work zones where chemical or radiological contamination is anticipated or known.

8.4 Contamination Reduction Zone and Corridor

The CRZ and CRC are transition areas surrounding the exclusion zone and are located between the exclusion zone and support zone (see Figure 8-2). The CRC may not be formally delineated, but will be designated by the travel path from the established CRZ-controlled entry and exit point and the exclusion zone entry and exit point. The CRZ and CRC will serve to buffer the support zone from potentially contaminated exclusion zone areas. The CRZ and CRC may serve as staging areas for equipment and temporary rest areas for personnel.

8.5 Support Zone

The support zone will be considered a “clean” area. The location of the support zone will be in a prevailing upwind direction from the exclusion zone (where possible) and readily accessible from the nearest road. The support zone is a designated area or building outside the CRZ and does not have to be

delineated. Support trailers, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment may be located in the support zone. Visitors who do not have appropriate training to enter other project areas will be restricted to this zone.

8.6 Site Security

All project site areas will be secured and controlled during normal work hours. During nonworking hours, the general project sites located inside INEEL facilities are controlled by the facility fence and normal security access requirements. However, additional project site security and control will be required to prevent unauthorized personnel from entering the project area and being exposed to potential safety or health hazards. This will be accomplished by delineating project areas with rope boundaries and posting where hazards are left unmitigated (e.g., open trenches, exposed contaminated soils, or equipment left onsite). Signage will be left in place during off-hours and weekends to prevent personnel from inadvertently entering the area.

The FTL has the primary responsibility for ensuring that the project area is secured. The HSO and RadCon, where required, will ensure that all health and safety and radiological postings of the area are intact when leaving the site and will be responsible for maintaining them for the duration of the project. Project personnel are trained about site access and control requirements during project-specific HASP training and will not cross roped areas without the proper training and authorization, regardless of whether a sign is in place or not.

Note: Signs are routinely lost because of high winds and will be replaced as soon as possible the next working day following discovery.

8.7 Wash Facilities and Designated Eating Areas

Ingestion of hazardous substances is possible when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. For project personnel, the nearest facility (INTEC or CFA) may be utilized for eating and as the designated wash facility.

8.8 Smoking Area

Smoking will only be permitted outside designated project or facility work areas. Personnel will comply with all INEEL smoking polices including disposing of smoking materials in the proper receptacle. The project safety professional or HSO will be the single point of contact for establishing any smoking area outside facilities, and such areas may not be permitted at certain times of the year due to high or extreme fire danger.

9. OCCUPATIONAL MEDICAL SURVEILLANCE

Task-site personnel will participate in the INEEL occupational medical surveillance program (or equivalent subcontractor program), as required by DOE Order 440.1A, "Worker Protection Management for DOE Federal and Contractor Employees," and 29 CFR 1910.120 or 29 CFR 1926.65. Medical surveillance examinations will be provided before assignment, annually, and after termination of HAZWOPER duties or employment. This includes

- Personnel who are, or may be, exposed to hazardous substances at or above the OSHA permissible exposure limit (PEL), or published exposure limits, without regard to respirator use for 30 or more days per year

- All employees who are injured, become ill, or develop signs or symptoms because of possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation

- All employees who wear a respirator for 30 days or more a year or as required by "Respiratory Protection" (29 CFR 1910.134).

Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually, as required by applicable company policies and procedures.

A single copy of the project HASP, job hazard analysis requirements, required PPE, confined space entry requirements (as applicable), and other exposure-related information will be made available, upon request, to the INEEL OMP physician (and subcontractor physicians) conducting medical surveillance for employees participating in this project. Exposure monitoring results and hazard information furnished to the OMP physician will be supplemented or updated annually (as stated in Section 12) as long as the employee is required to maintain a hazardous waste and material employee medical clearance. The OMP physician will then evaluate the physical ability of an employee to perform the work assigned.

A documented medical clearance (e.g., a physician's written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him or her at increased risk of health impairment from working in hazardous waste operations, emergency response operations, respirator use areas, and confined space areas, as applicable. The physician may impose restrictions on the employee by limiting the amount and type of work performed.

Personnel are responsible for communicating any work or medical restrictions to their supervisor so modified work assignments can be made if necessary. During the applicable company policies and procedures prejob briefing, the supervisor conducting the briefing should ask workers if they have any work restrictions. However, it is the employees responsibility to inform the supervisor of any work or medical restrictions.

9.1 Subcontractor Workers

Subcontractor project personnel will participate in a subcontractor medical surveillance program that satisfies the applicable requirements of 29 CFR 1926.65. This program must make medical examinations available before assignment, annually, and after termination of hazardous waste duties as stated above. The physician's written opinion, as defined by 29 CFR 1910.120(f)(7) (or equivalent), will serve as documentation that subcontractor personnel are fit for duty or will list work restrictions.

Medical data from the subcontractor employee's private physician, collected pursuant to hazardous material worker qualification, will be made available to the INEEL OMP physicians on request.

9.2 Injuries on the Site

It is the policy of the INEEL that an INEEL OMP physician examine all injured personnel for the following reasons:

- An employee is injured on the job
- An employee is experiencing signs and symptoms consistent with exposure to a hazardous material
- An employee is believed to have been exposed to toxic substances or physical or radiological agents in excess of allowable limits during the course of a project at the INEEL.

Note: In the event of an illness or injury, the decision to provide first aid and transport to the nearest medical facility or whether to immediately request an ambulance and continue to stabilize and provide first aid should be based on the nature of the injury or illness and likelihood that transporting the individual may cause further injury or harm. Most likely, the person making this decision will only be trained to the medic first/CPR level and should contact the CFA medical facility at 777 or 526-1515 for further guidance if there is any question as to the extent of injury or potential to cause further harm by movement of the injured individual.

In the event of a known or suspected injury or illness caused by exposure to a hazardous substance or physical or radiological agent, the employee will be transported to the nearest INEEL medical facility for evaluation and treatment, as necessary. The HSO and FTL are responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor's name and phone number
- Substance, physical or radiological agent exposed to (known or suspected), and material safety data sheet, if available
- Nature of the incident and injury or exposure and associated signs or symptoms of exposure
- First aid or other measures taken
- Locations, dates, and results of any relevant personal or area exposure monitoring or sampling
- List of PPE worn during this work (e.g., type of respirator and cartridge used).

Further medical evaluation will be determined by the treating or examining physician in accordance with the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120 and/or 29 CFR 1926.65.

Note: In the event of an illness or injury, subcontractor employees will be taken to the closest INEEL medical facility or be transported by INEEL ambulance to have an injury stabilized before transport to the subcontractor's treating physician or off-Site medical facility.

The INTEC shift supervisor and project manager will be contacted if any injury or illness occurs at a project site. As soon as possible after an injured employee has been transported to the INEEL medical facility, the FTL or designee will make notifications as indicated in Table 11-4.

9.3 Substance-Specific Medical Surveillance

The contaminant concentrations and potential for exposure in Section 8 indicate that no occupational exposures approaching the regulatory substance-specific action limits are anticipated. Therefore, substance-specific medical surveillance is not anticipated for site workers. If contaminants of concern are identified during site work tasks, exposures will be evaluated and quantified to determine the substance-specific applicability.

If new contaminants of concern are identified during the course of project tasks, then exposures will be evaluated and quantified to determine if a substance-specific standard applies. If regulatory mandated substance-specific standard action levels are triggered, then affected personnel will be enrolled in applicable substance-specific medical surveillance programs.

10. PROJECT PERSONNEL

The organizational structure for this project reflects the resources and expertise required to perform the work, while minimizing risks to worker health and safety, the environment, and the general public. The names of the individuals in key roles at the site, and lines of responsibility and communication, are shown on the organizational chart for the site (Figure 10-1). The following sections outline the responsibilities of key site personnel.

10.1 Key Site Personnel Responsibilities

10.1.1 Field Team Leader

The FTL represents the organization at the site with delegated responsibility for the safe and successful completion of the project. The FTL works with the project manager (PM) to manage field sampling, operations, and to execute the daily work plan. The FTL enforces site control, documents activities, and may conduct the daily safety briefings at the start of the shift. Health and safety issues may be brought to the attention of the FTL. The FTL serves as the geologist on the drill site and provides technical resources to the drill team.

If the FTL leaves the site, an alternate individual will be appointed to act as the FTL. Persons acting as FTLs on the site must meet all the FTL training requirements outlined in Section 7 of this HASP. The identity of the acting FTL will be conveyed to site personnel, recorded in the FTL logbook, and communicated to the facility representative, when appropriate. The FTL may also serve as the project geologist.

10.1.2 Subcontractor Technical Representative

The subcontractor technical representative (STR) is the individual representing remedial design/remedial action management at the site, with ultimate responsibility for the safe and successful completion of assigned project tasks. The STR manages field operations and executes the work plan, enforces site controls and documents task-site activities, and may conduct the daily plan of the day briefing at the start of the shift. All health and safety issues at the task site must be brought to the STR's attention. The STR also will serve as the primary area warden during the project.

If the STR leaves the project site, an alternate individual will be appointed to act as the STR. Persons acting as STR on the project site must meet all STR training requirements outlined in Section 4 of the project HASP. The identity of the acting STR will be conveyed to task-site personnel, recorded in the daily force reports, and communicated to the facility representative when appropriate.

If the nature of the fieldwork requires involvement of field team staffing by equipment operators, laborers, or other crafts, a representative from the organization supplying these additional resources interfaces with the STR to provide work supervision. This person may be designated the jobsite supervisor (JSS).

10.1.3 Sampling Team

The sampling team will perform the on-Site task necessary to collect the samples. The sampling team will consist of a minimum of two members, and the buddy system will be implemented. The IH and RadCon personnel will support the sampling team when inside the contamination area. The sampling team will be led by the FTL who may also serve as the field geologist.

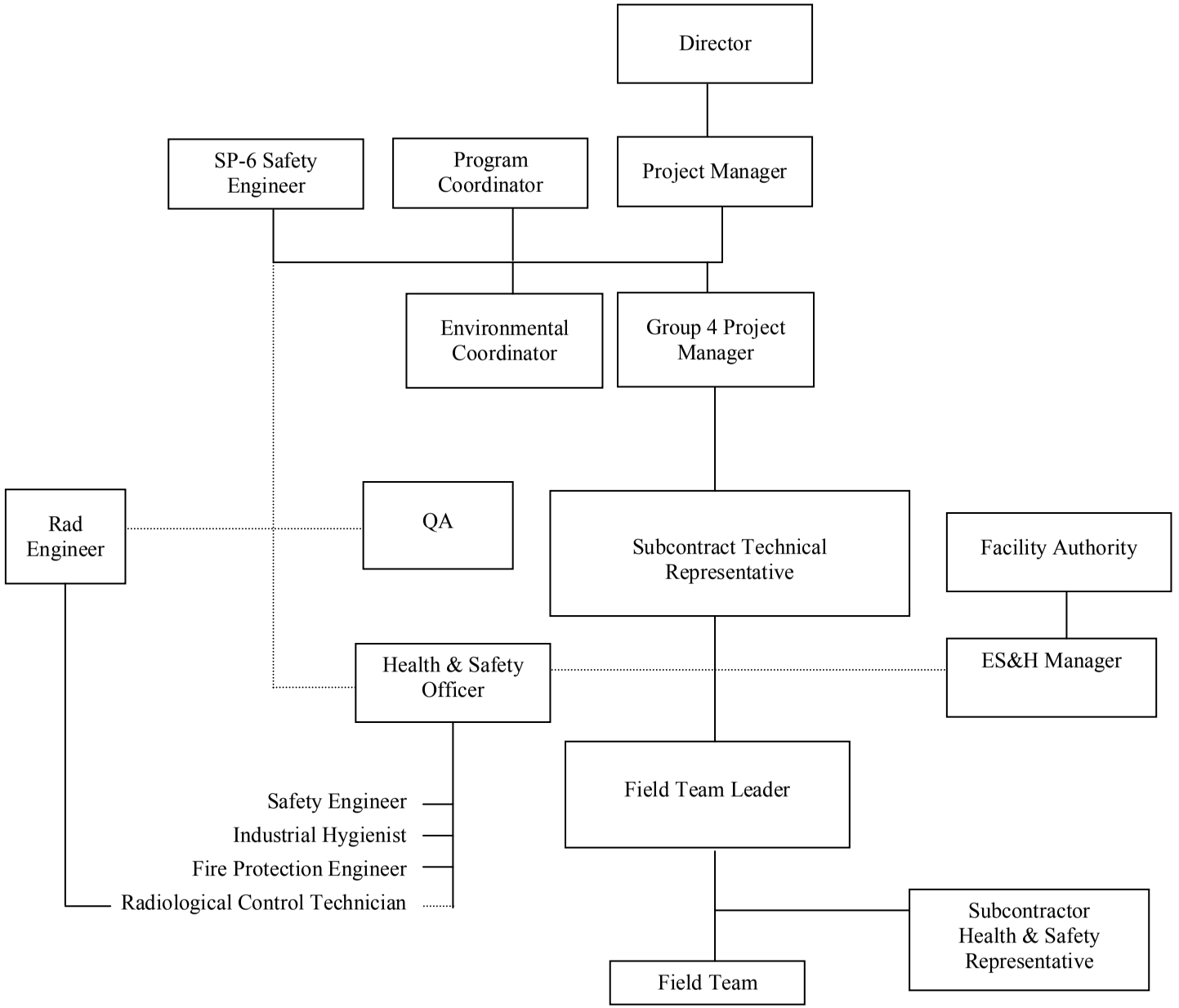


Figure 10-1. Key project personnel organizational chart.

10.1.4 Subcontractor Jobsite Supervisor

A subcontractor JSS will accomplish some of the logging tasks during the project. The subcontractor JSS serves as the subcontractor safety representative at the site. The subcontractor JSS may also serve as the subcontractor PM. The subcontractor JSS is the subcontractor field supervisor for subcontractor personnel assigned to work at the site. The subcontractor JSS and FTL work as a team to accomplish daily operations at the site, identify and obtain additional resources needed at the site, and interact with the HSO, IH, SE, radiation engineer (RE), and RCT on matters regarding health and safety. The STR and FTL, must be informed about any health and safety issues that arise at the site and may stop work at the site if an unsafe condition exists. The subcontractor JSS will provide information to the STR, FTL, and HSO regarding the nature of their work for input at the daily prejob briefing.

10.1.5 Site Personnel

All site personnel, including INEEL and subcontractor personnel, will understand and comply with the requirements of this HASP. The FTL or STR will brief site personnel at the start of each shift. During the prejob briefing, all daily tasks, associated hazards, engineering and administrative controls, required PPE, work control documents, and emergency conditions and actions will be discussed. The project HSO, IH, and RadCon personnel will provide input to clarify task health and safety requirements. All personnel are encouraged to ask questions, regarding site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner, based on the lesson learned from previous day's activities.

Once at the site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL, STR, or HSO for corrective action. **If at any time, site personnel discover an unsafe condition, at-risk behavior, or an environmental or quality deficiency, site personnel are authorized to stop work immediately, then notify the FTL, STR, or HSO of the unsafe condition.**

10.1.6 Health and Safety Officer

The HSO is the person assigned to the site who serves as the primary contact for health and safety issues. The HSO advises the PM and FTL on all aspects of health and safety and is authorized to stop work at the site if any operation threatens worker or public health and/or safety. The HSO may be assigned other responsibilities, as stated in other sections of this HASP, as long as they do not interfere with the primary responsibilities. The HSO is authorized to verify compliance to the HASP, conduct inspections, require and monitor corrective actions, monitor decontamination procedures, and require corrections, as appropriate. The HSO is supported by environmental, safety, and health/quality assurance (ES&H/QA) professionals at the site (safety engineer, IH, RCT, RE, environmental coordinator, and facility representative, as necessary).

Persons assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, SE, or in some cases the FTL (depending on the hazards, complexity, and size of the activity involved and requiring concurrence from the safety, health, and quality assurance (SH&QA) manager at the site, other site responsibilities of the HSO must not conflict (in philosophy or in terms of significant added volume of work) with the role of the HSO. If it is necessary for the HSO to leave the site, the HSO will appoint an alternate individual to fulfill this role. The identity of the acting HSO will be recorded in the logbook, and site personnel will be notified. Persons assigned as acting HSO must have all qualifications of the HSO.

10.1.7 Radiological Control Technician

The assigned RCT is the primary source for information and guidance on radiological hazards and will be present at the site during all operations. Responsibilities of the RCT include radiological surveying of the site, equipment, and samples; providing guidance for radioactive decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radionuclide contamination occurs. The RCT will notify the FTL whenever background levels of radiation are detected. The radiological work permit (RWP) may be canceled if levels are above those identified on the RWP. The RCT must notify the FTL and HSO of any radiological occurrence that must be reported, and respond as directed by applicable company manuals. The RCT may have other duties at the site, as specified in other sections of this HASP or in INEEL PRDs and/or MCPs.

10.1.8 Occasional Workers

All persons on the site, but who are not part of the field team, are considered occasional workers for the purposes of this project (e.g., surveyor, equipment operator, or other crafts personnel not assigned to the project). A person will be considered "on-Site" when present in or beyond the designated SZ. Occasional workers will be deemed occasional site workers per 29 CFR 1910.120/1926.65 and must meet minimum training requirements for such workers and any additional site-specific training that is identified in Section 7. If the nature of a occasional workers tasks requires entry into the EZ, or radiologically controlled areas, then he/she must meet all the same training requirements as other field team members. Also, a site representative must accompany all occasional workers until they have completed three days of supervised field experience.

10.1.9 Visitors

All visitors with official business at the site, including INEEL personnel, representatives of DOE, and/or state or federal regulatory agencies, may not proceed beyond the SZ without receiving site-specific HASP training, signing a HASP-training acknowledgment form, receiving a safety briefing, wearing the appropriate PPE, and providing proof of meeting all training requirements specified in Section 7 of this HASP. A fully trained site representative (such as the FTL, STR, or HSO, or a designated alternate) will escort visitors at all times while on the site. A casual visitor to the site is a person who does not have a specific task to perform or other official business to conduct at the site. **Casual visitors are not permitted on the site.**

10.2 Facility Support Personnel

Facility Support Personnel represent INTEC Operations and provide support/oversight to project personnel.

10.2.1 INTEC Facility Authority

The INTEC facility authority reports to the director of site operations and interfaces with the INTEC facility manager. The INTEC facility authority is responsible for several functions and processes in the INTEC area that include:

- Performing all work processes and work packages
- Establishing and executing a monthly, weekly, and daily operating plan
- Executing the ES&H/QA program

- Executing the ISMS
- Executing enhanced work planning
- Executing the VPP
- Maintaining all environmental compliance
- Executing that portion of the voluntary compliance order that pertains to the INTEC area.

10.2.2 Facility Manager

The INTEC's facility manager is responsible for maintaining his/her assigned facility, and must be cognizant of work being conducted in the facility. The INTEC facility manager is responsible for the safety of personnel and for the safe completion of all project activities conducted within his/her area. Therefore, the facility manager and INTEC shift supervisor will be kept informed of all activities performed in the area. The shift supervisor and FTL will agree on a schedule for reporting work progress and plans for work. The shift supervisor may serve as advisor to site personnel with regard to his/her area of operation.

10.2.3 Radiological Engineer

The RE is the primary source for information and guidance, relative to the evaluation and control of radioactive hazards at the site. The RE provides engineering design criteria and review of containment structures and makes recommendations to minimize health and safety risks to site personnel. Responsibilities of the RE include: (1) performing radiation exposure estimates and ALARA evaluations, (2) identifying the type(s) of radiological monitoring equipment necessary for the work, (3) advising the FTL and RCT of changes in monitoring or PPE, and (4) advising personnel on the site evacuation and reentry. The RE may also have other duties to perform, as specified in other sections of this HASP or in applicable company manuals.

10.3 Project Technical Support Personnel

Project Technical Support Personnel provide both direct and indirect technical support to the project with frequent project visits, but are normally located at in-town facilities.

10.3.1 Project Manager

The PM will ensure that all activities conducted during the project comply with INEEL MCPs and PRDs; all applicable OSHA, EPA, DOE, U.S. Department of Transportation, and State of Idaho requirements; and that tasks comply with Plan applicable company policies and procedures, the quality assurance project plan, this HASP, and the sampling and analysis plan. The PM coordinates all document preparation, field, laboratory, and modeling activities. The INEEL PM is responsible for the overall work scope, schedule, and budget. The INEEL PM will ensure that an Employee Job Function Evaluation is completed for all project employees, reviewed by the project IH for validation, and then submitted to the OMP for determination of whether a medical evaluation is necessary.

10.3.2 Industrial Hygienist

The IH assigned to the project is the primary source for information regarding nonradiological hazardous and toxic agents at the site. The IH assesses the potential for worker exposures to hazardous

agents according to applicable company policies and procedures, and accepted industry IH practices and protocol. By participating in site characterization, the IH assesses and recommends appropriate hazard controls for the protection of site personnel, operates and maintains airborne sampling and monitoring equipment, reviews equipment for effectiveness, and recommends and assesses the use of PPE required in this HASP, recommending changes, as appropriate. Following an evacuation, the IH in conjunction with other recovery team members will assist the HSO in determining whether conditions exist for safe site reentry, as described in Section 11. Personnel showing health effects (signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an OMP physician by the IH, their supervisor, or the HSO. The IH may have other duties at the site, as specified in other sections of this HASP, or in INEEL PRDs and/or MCPs. During emergencies involving hazardous materials, airborne sampling and monitoring results will be coordinated with members of the Emergency Response Organization (ERO).

10.3.3 Safety Engineer

The assigned safety engineer reviews work packages, observes site activity, assesses compliance with applicable company manuals, signs SWPs, advises the FTL on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the site. The safety engineer may have other duties at the site, as specified in other sections of this HASP, or in applicable company policies and procedures.

10.3.4 Fire Protection Engineer

The assigned fire protection engineer reviews the work packages, conducts preoperational and operational fire hazard assessments, and provides technical guidance to site personnel regarding all fire protection issues. Additionally, the assigned project fire engineer will provide fire extinguisher training to all project team personnel as part of the site-specific training.

11. EMERGENCY RESPONSE PLAN

This emergency response plan defines the roles and responsibilities of project personnel during an emergency. Such an emergency could be at the project site, on a tenant facility or collocated facility, or a Site-wide emergency. This section provides details of the INEEL ERO applicable company policies and procedures.

Applicable company policies and procedures may be activated in response to events occurring at the project site, at the INEEL, or at the discretion of the emergency coordinator or emergency action manager. Once the INEEL plan is activated, project personnel will follow the direction and guidance communicated by the emergency coordinator.

Note: The OSHA HAZWOPER definition of an emergency is not defined the same as classified by DOE Orders 151.1B, "Comprehensive Emergency Management System," and 231.1A, "Environmental, Safety, and Health Reporting." For this reason, the term "event" will be used in this section when referring to project HAZWOPER emergencies.

11.1 Preemergency Planning

The applicable company policies and procedures provide the basis for preplanning all INEEL emergency events. This base plan is supplemented with INEEL facility-specific addendums. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect project activity. Preplanning also ensures that the project emergency response program is integrated with that of the INEEL. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency implementing procedures. Finally, the HASP addresses project-specific hazards, potential emergency events, and the actions to take following such events.

11.2 Emergency Preparation and Recognition

The sections for hazards identification and mitigation and accident prevention provided the strategy that will be followed at the project site to prevent accidents. Similarly, emergency preparation and recognition also will require project personnel to be constantly alert for potentially hazardous situations and signs and symptoms of chemical exposure or releases. All field personnel should be familiar with the techniques for hazard recognition and the assigned action levels and associated actions to be taken as identified in Section 1.

Applicable company policies and procedures, requirements for training, emergency actions, and notifications will be followed for all projects conducted outside facility.

Preparation and training on emergencies will include proper site access and egress procedures in response to project events and INEEL emergencies as part of the project-specific HASP training and facility access training where applicable. Visitors also will receive this training on a graded approach based on their site access requirements. Visitor training will include, alarm identification, location and use of communication equipment, location of site emergency equipment, and evacuation. Emergency phone numbers and evacuation route maps will be discussed in the initial pre-job briefing, following changes to this information, and occasionally to keep project personnel informed.

On-scene response to and mitigation of site emergencies could require the response from both project personnel and INEEL fire department personnel. Emergencies could include the following scenarios:

- Accidents resulting in injury
- Fire
- Spill of hazardous or radiological material
- Tornadoe, earthquake, or other adverse natural phenomena
- Vehicle or transportation emergency
- Safeguard and security emergency
- Emergency at adjacent facilities resulting in an evacuation or take-cover actions at the task site.

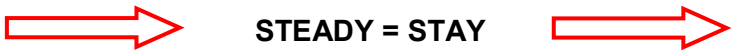
11.3 Emergency Alerting, Responses, and Sheltering

11.3.1 Alarms

Alarms and signals are used at the project site and the INEEL to notify personnel of abnormal conditions that require a specific response. Responses to these alarms are addressed in general employee training. Emergency sirens located throughout the INEEL serve as the primary means for signaling emergency TAKE COVER or EVACUATION protective actions. To signal site personnel of a project-initiated emergency event, a separate set of emergency signals has been established based on horn blasts (e.g., vehicle or air horn).

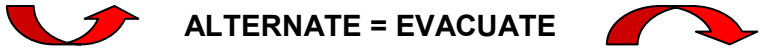
Depending on the field location (within or outside a facility), facility alarms may not be able to be heard at the project site. If the project site is outside the audible range of the facility alarms, then the notification to take cover or evacuate should be received on the field radio. The project signals will then be used to alert personnel of the emergency actions.

11.3.1.1 Take Cover—Continuous Siren. Radiation or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest habitable building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE COVER is usually announced by activating the emergency siren. The signal to take cover is a CONTINUOUS SIREN.



However, the order to take cover also can be given by word of mouth, radio, or voice paging system. When ordered to TAKE COVER, project personnel will place the site and equipment in a safe configuration (as appropriate) and then seek shelter in the project trailer or vehicle (if outside the facility). Eating, drinking, and smoking are not permitted during take-cover conditions.

11.3.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the project site and the entire facility area. The evacuation signal is an ALTERNATING SIREN. When ordered to EVACUATE, project personnel will place equipment and the site in a safe configuration (as appropriate) and then proceed along the specified evacuation route to the designated assembly area or as directed by the emergency action manager (EAM).



For total area evacuation, the facility Emergency Control Center (ECC) is activated and all personnel will gather at the primary facility evacuation assembly area or a location designated by the EAM or FTL if outside a facility. The FTL or trained alternate will then complete the personnel accountability using the attendance log. In this situation, the project area warden will report the result of the accountability process to the facility area warden coordinator in the designated assembly area or the EAM if on a backshift.

11.3.1.3 Local Area Evacuation—Vehicle Horn Blast. A local area evacuation is the complete withdrawal of personnel from the project site but it does not require the complete evacuation of the entire facility or INEEL area. A single long horn blast (e.g., vehicle) will serve as the project's primary emergency evacuation signal (as listed on Table 11-1). However, the order to evacuate also can be given by word of mouth, radio, or voice paging system. When ordered to evacuate the project site, personnel will place the site in a safe condition (as appropriate) and then proceed along the specified evacuation route to the assembly area designated for local area evacuations or as directed by the FTL. Eating, drinking, and smoking are not permitted during any protective action.

Table 11-1. Project internal emergency signals.

Device or Communication Method	Signal and Associated Response
Vehicle horn blasts	**One long blast**—Emergency evacuation, evacuate project site immediately. Proceed in an upwind direction to designated assembly area as specified by the FTL. **Two short blasts**—Nonemergency evacuation of immediate work area. Proceed to designated assembly area as specified by the FTL. **Three long blasts** or verbally communicated—all clear, return to project site.

11.4 Personnel Roles, Lines of Authority, and Training

This section outlines personnel roles and responsibilities associated with emergency action.

11.4.1 The INEEL Response Organization

The INEEL ERO structures are based on the incident command system and are described in applicable company policies and procedures.

11.4.2 Role of Project Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. FTL and project personnel responsibilities are described below. Personnel will respond to emergencies only within the limits of their training and designated by their position. All personnel are trained to the facility-specific emergency actions as part of the access training or will be escorted by someone who has been trained. Emergency response actions also will be covered as part of the HASP briefing as stated in Table 7-1.

11.4.2.1 Field Team Leader. The FTL (or designated alternate) is responsible for initiating all requests for emergency services (e.g., fire and medical) and for notifying the INTEC shift supervisor of abnormal (or potential emergency) events that may occur during the project. The FTL may also serve as the area warden (or designate that responsibility to another person who has been trained as area warden) and conduct personnel accountability. Personnel accountability will then be reported to the shift supervisor. Additionally, the FTL will control the scene until a higher-tiered incident command system authority arrives at the scene to take control. When relinquishing this role the FTL (or designated alternate) will provide all information about the nature of the event, potential hazards, and other information requested.

11.4.2.2 Project Personnel. Every person at the project site has a role to play during a project event or INEEL emergency. Each employee must be constantly aware of potential problems or unexpectedly hazardous situations and immediately report these situations to the FTL. All personnel are expected to watch out for their fellow workers, to report their concerns to the FTL, and to take emergency actions as described in this section. Roles and responsibilities are further detailed in Table 11-2.

11.4.2.3 Personnel Accountability and Area Warden. Project personnel are required to evacuate the site in response to TAKE COVER, EVACUATION, and local evacuation alarms. In all cases, the FTL (or trained designee) will account for the people present on the project site. The FTL (or trained alternate) will serve as the area warden for the project and will complete the personnel accountability (following positive sweeps of the project site) based on the attendance log. The results of this accountability will then be communicated to the FTL for reporting to the shift supervisor or EAM if the ECC is activated.

Table 11-2. Responsibilities during an emergency.

Responsible Person	Action Assigned
Field team leader (or designee)	Signal evacuation.
	Report spill to shift supervisor and take mitigative actions.[a]
	Contact shift supervisor or WCC (if the shift supervisor cannot be contacted).
Field team leader (or trained designee)	Serve as area warden and conduct accountability and report to shift supervisor.
Health and safety officer and medic and first-aid trained personnel	Administer first-aid to victims (voluntary basis only).

a. The environmental affairs spill response categorization and notification team will be contacted by the shift supervisor or emergency coordinator.

11.4.2.4 Spills. If the material spilled is known and is small enough to be safely contained, project personnel will handle spill control using spill supplies at the site and immediately report the incident to the shift supervisor or WCC if the shift supervisor cannot be contacted. Reporting requirements will be determined by the facility emergency coordinator in accordance with applicable company policies and procedures. If any release of a hazardous material occurs, project personnel will comply with the following immediate spill response actions.

11.4.2.4.1 Untrained Initial Responder—The requirements for the untrained initial responder (or if the material characteristics are unknown) are listed below:

- Place equipment in a safe configuration
- **Evacuate** and **isolate** the immediate area
- Notify and then **seek help** from and **warn** others in the area
- Notify the FTL and HSO.

11.4.2.5 Trained Responder. The requirements for the trained responder where material characteristics are known and no additional PPE is required are listed below:

- Place all equipment in a secure configuration
- **Seek help** from and **warn** others in the area
- **Stop** the spill if it can be done without risk (e.g., returning the container to the upright position, closing valve, and shutting off power)
- **Provide** pertinent information to the FTL and HSO
- **Secure** any release paths if safe to do so.

11.5 Medical Emergencies and Decontamination

Medical emergencies and responses to injuries or suspected exposures will be handled as stated in Section 9.2. Decontamination of personnel and equipment is described in Section 12.2.2.

11.6 Emergency Communications

In the event of an emergency, the capability to summon INEEL emergency response resources to immediately notify site personnel and inform others of site emergencies is required. Communications equipment at the task site will be a combination of cellular phones and pagers. Communication methods described below will be used during emergency situations.

11.6.1 Notifications

During emergency situations, the INTEC facility shift supervisor will be notified of any project emergency event. The shift supervisor will then make the required ERO notification. The following information should be communicated, as available, to the shift supervisor:

Note: If the shift supervisor cannot be contacted then the WCC will be notified of the event and the information listed below communicated. The WCC also must be told that notification to the facility shift supervisor and emergency coordinator has not been made.

- The caller's name, title (e.g., FTL or HSO), telephone number, and pager number
- Exact location of the emergency
- Nature of the emergency including time of occurrence, current site conditions, and special hazards in the area
- Injuries, if any, including numbers of injured, types of injuries, and conditions of injured
- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information as requested.

11.7 Emergency Facilities and Equipment

Emergency response equipment maintained at the project site includes the items listed in Table 11-3. The applicable company policies and procedures list emergency equipment available at the facility. Fire department personnel also are trained to provide immediate hazardous material spills and medical services. The INTEC has a nurse available for immediate medical needs, and the CFA-1612 medical facility is manned by all levels of medical professionals who are available to evaluate and stabilize injured personnel or those experiencing signs and symptoms of exposure.

Table 11-3. Emergency response equipment to be maintained at the project site during operations.

Equipment Name and Quantity Required	Location at Task Site	Responsible Person	Frequency of Inspection or Verification[a]
First-aid kit	Project vehicle during well sampling activities, at project site during well installation activities.	Subcontractor and HSO	Weekly
Eyewash bottles[b] Eyewash station[b]	Support zone	Subcontractor and HSO	Weekly
Extra personal protective equipment	Support zone	FTL	Weekly
Communications: one pager, one cell phone.	At project site	FTL	Daily
Fire extinguishers[c]	Support zone	Subcontractor and HSO	Weekly

a. This is verification that equipment is present at the project location before starting tasks and no inspection tag is required.

b. An eyewash bottle will be used to provide an immediate eye flush if required. The location of the eyewash station will be identified by the HSO during the pre-job briefing since cold weather could freeze the contents.

c. A minimum of two 10A/60BC extinguishers are required for well installation activities. If either is discharged, it will be returned for servicing and recharging.

11.8 Evacuation Assembly Areas and Central Facilities Area Medical Facility

The INTEC maintains primary and secondary evacuation routes and assembly areas (see Figure 11-1). These routes may be used in response to a total facility area evacuation as directed by the EAM. Copies of the evacuation assembly areas and the CFA-1612 medical facility route (see Figure 11-2) will be available at the project site.

Note: If the project is conducted outside of a facility then the INEEL evacuation routes listed in applicable company policies and procedures will be used. Evacuation routes will be discussed in the daily prejob briefing.

11.9 Reentry, Recovery, and Site Control

All reentry and recovery activities will follow general site security and control requirements identified in Section 8 unless conducted as part of an emergency response action. All entries to the project site performed in support of emergency actions will be controlled by the on-scene commander.

11.9.1 Reentry

During an emergency response it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include:

- Performing personnel search and rescues
- Responding to medical first-aid needs
- Performing safe shutdown actions
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radiation or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken as a graded approach depending on the nature of the initiating event.

11.9.2 Recovery

After the initial corrective actions have been taken and effective control established, response efforts will shift toward recovery. Recovery is the process of assessing postevent and postemergency conditions and developing a plan for returning to preevent and preemergency conditions, when possible, and following the plan to completion. The EAM is responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The EAM, with concurrence from the facility operations director, will appoint the recovery manager.

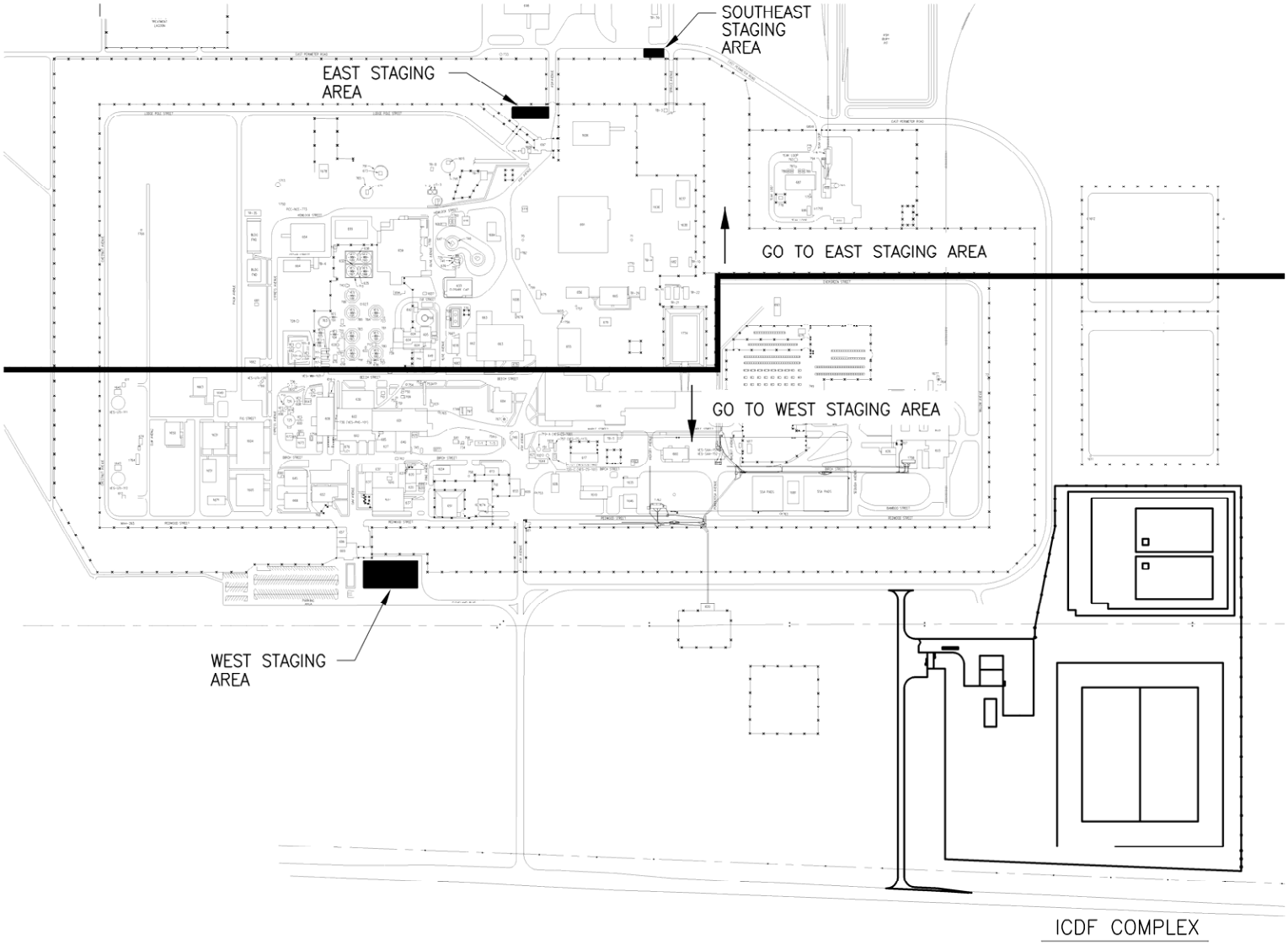


Figure 11-1. INTEC primary evacuation assembly areas.

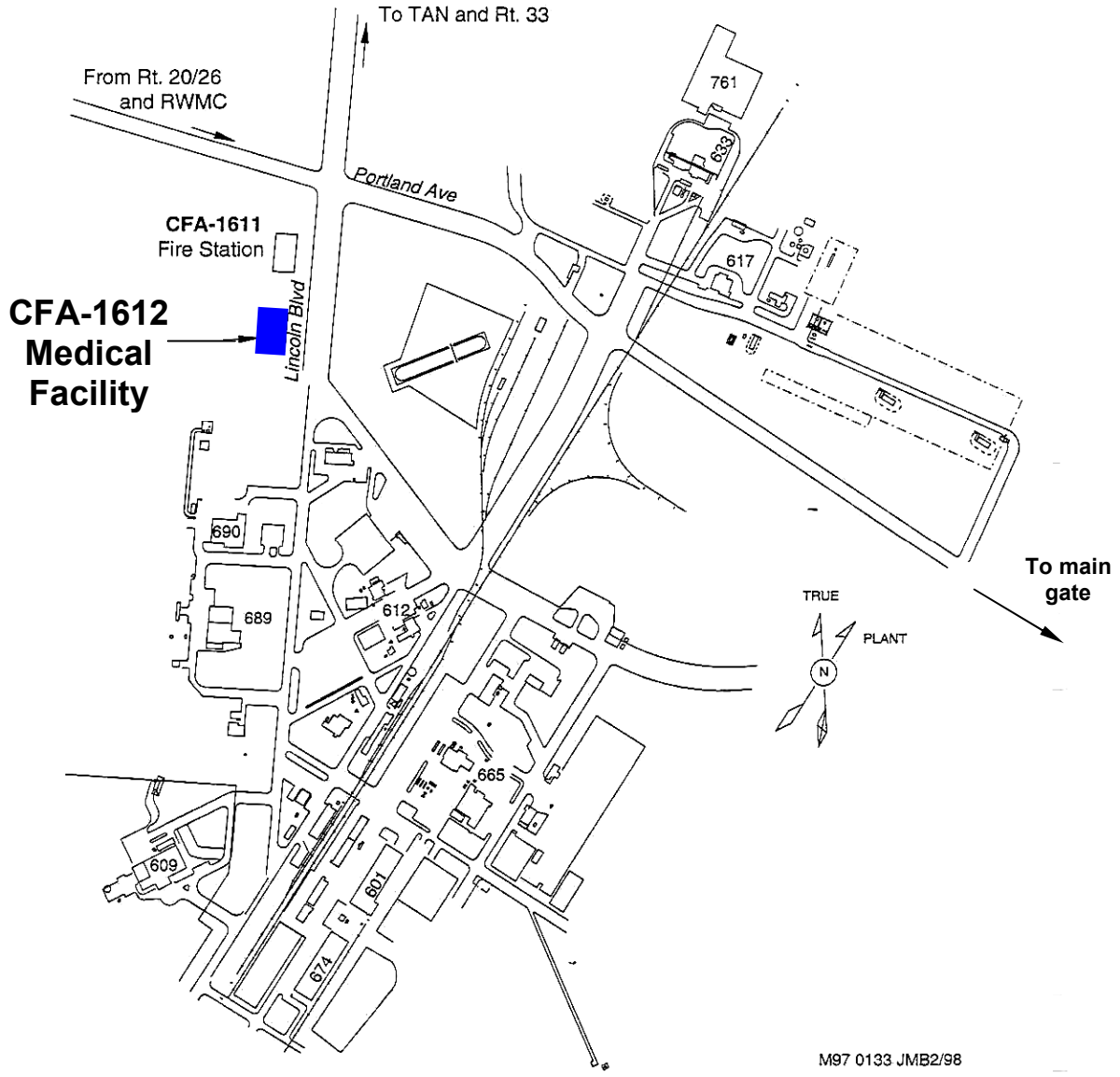


Figure 11-2. Map showing the route to the nearest medical facility (CFA-1612).

11.10 Critique of Response and Follow-up

A review and critique will be conducted following all emergency events, drills, and exercises at the INEEL. In some cases, an investigation may be required before commencing recovery actions. For this reason care should be exercised to preserve evidence when appropriate.

11.11 Telephone and Radio Contact Reference List

Table 11-4 lists the points of contact for the project. A copy of this list will be kept in the FTL logbook. Because personnel listed may change frequently, working copies of this list will be generated as require to note new positions and changes of personnel assigned. Changes to this table will not require a document action request.

Table 11-4. Project emergency contact list.

Contact Title	Contact Name	Phone Number or Radio Net	Cellular Phone Number	Pager Number
Fire, medical emergency, and security Warning Communications Center		777 526-1515		
INTEC Shift Supervisor		6-3100		
INTEC Facility Authority	Riley Chase	6-0018	521-6916	5669
INTEC Environment, safety, and health manager	Corrine Jones	6-8079	520-4191	5720
Radiological Control supervisor	Keith Branter	6-2486	520-6485	5572
Radiological engineer	Rick Butler	6-4359		7799
DOE-ID facility representatives	Jerry McNew Mary Verwolf	526-5108 526-7001	521-7394 —	7619 —
Manager of projects	Doug Kuhns	6-8226	521-5560	
Project manager	Howard Forsythe	6-1603	520-1307	7695
Field team leader	Ken Manchester[a]	6-2629	520-8074	—
	Gary Oberhansley[b]	557-7872	—	3391
Health and safety officer	Larry McManamon[a]	6-3658	521-8405	
Industrial hygienist	Micah Nielsen	6-5049	520-0531	6671
Environmental compliance	Lee Tuott	6-7990		7855
Subcontract technical representative	Virgil Morriss[a]	6-4581	520-4923	5769

Note: Shaded fields indicate information not relevant to emergency contact list.

a. Day-shift project personnel.

b. Back-shift project personnel.

12. DECONTAMINATION PROCEDURES

Every effort will be made to prevent contamination of personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material handling requirements and procedures for contaminated or potentially contaminated materials. If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls, in combination with PPE upgrades, may be necessary to control the contact hazard. However, if chemical or radiological contamination is encountered at levels requiring decontamination, this section provides guidance on how it will be performed.

12.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize personnel contact with contaminated surfaces if such surfaces are encountered or may be contacted during project tasks. The following contamination control and prevention measures will be employed if contamination is encountered or anticipated:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Implement immediate decontamination procedures to prevent the spread of contamination (if contamination is found on the outer surfaces of equipment)
- Use only the established control entry and exit point from the contaminated area to minimize the potential for cross-contamination and expedite contamination-control surveys
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated.

12.2 Equipment and Personnel Decontamination

Personnel and equipment decontamination procedures are necessary to control contamination and to protect personnel should contamination be encountered. Both chemical and radionuclide contamination will be decontaminated from surfaces of a contaminated area at the exit and other designated work area boundaries.

If radionuclide decontamination operations are required for equipment or areas, they will be performed in accordance with applicable company manuals. Nonradionuclide decontamination will be evaluated by the HSO and project industrial hygienist, on a case-by-case basis, to determine the most appropriate level of PPE to be worn. An RWP will be generated if radiological contamination is encountered. Specific equipment and personnel decontamination methods are provided in the following subsections.

12.2.1 Equipment Decontamination

Decontamination of sampling equipment will be conducted in accordance with applicable company policies and procedures. If contact with potentially contaminated surfaces cannot be avoided, then additional engineering controls in combination with PPE upgrades may be necessary to control the contact hazard. Equipment will be decontaminated based on the source of contamination.

If radionuclide decontamination operations are required for equipment or areas, they will be performed in accordance with applicable company manuals. Nonradionuclide decontamination will be evaluated on a case-by-case basis by the HSO and project industrial hygienist to determine the most appropriate PPE (Level C protective clothing will initially be selected if airborne contaminants may be generated until site monitoring can demonstrate downgrading is warranted).

A decontamination pad may be established if nonradionuclide decontamination is required before equipment can be released. If it is deemed necessary and appropriate by the project industrial hygienist, then a wet wiping with an amended water solution (e.g., amended with a nonphosphate detergent such as Alconox) or a potential steam cleaning of this equipment may be conducted before it is allowed to leave the decontamination area. A drainage system that allows for a single collection point will be established if steam cleaning is performed. Decontamination wastewater will be collected using a submergible pump and containerized and characterized in accordance with applicable company policies and procedures.

12.2.2 Personnel Decontamination

Project activities will be conducted in Level D PPE unless upgrading is warranted. Engineering controls in conjunction with work controls and proper handling of samples will serve as the primary means to eliminate the need for personnel decontamination. If modified Level D protective clothing is required, all items will be inspected following the list in Section 6.

12.2.3 Decontamination in Medical Emergencies

If a person is injured or becomes ill, that person will be immediately evaluated by first-aid trained personnel (on a voluntary basis) at the project task site. If the injury or illness is serious, then the FTL will contact the INTEC shift supervisor or WCC (if the shift supervisor cannot be reached) to summon emergency services (i.e., fire department and CFA medical services) to the project site.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible) and other contaminated areas may be contained with a bag or glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), the individual will be wrapped in plastic, blankets, or other available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The industrial hygienist or RCT (depending on the type of contamination) will accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE then will be removed at the CFA medical facility and carefully handled to prevent the spread of contamination. The applicable company policies and procedures contain information on proper handling of radionuclide-contaminated wounds.

12.3 Doffing Personal Protective Equipment and Decontamination

As stated earlier, no personnel decontamination beyond doffing of PPE is anticipated for this project. Careful removal of the outer PPE will serve as the primary decontamination method.

The specific doffing sequence of modified Level D or C PPE, and associated decontamination procedures, will be based on the nature of the contamination. A general approach for doffing modified Level D or C PPE is described below. However, no one doffing strategy works for all circumstances. Modifications to this approach are appropriate if site conditions change or at the discretion of the project HSO in consultation with the project industrial hygienist and RCT.

12.3.1 Modified Level D Personal Protective Equipment Doffing and Decontamination (if Required)

If required to be worn, modified Level D protective clothing (e.g., disposable coveralls) will be doffed following standard radiological removal techniques (rolling outside surface inward and down) and will constitute the initial decontamination step. All PPE will be placed in the appropriately labeled containers.

12.3.2 Level C Personal Protective Equipment Doffing and Decontamination (if Required)

If respiratory protection is worn in conjunction with protective clothing (e.g., Level C PPE), then the modified Level D sequence will be followed with one additional step. That additional step is to remove the respirator and place it in a separate container from the discarded protective clothing. Depending on the type of contamination encountered, this step will be followed by a radiological survey or industrial hygienist evaluation.

12.3.3 Site Sanitation and Waste Minimization

Personnel inside the INTEC fence may use the restroom facilities at CPP-1605. Portable toilet facilities provided at the project drill site will be provided by the drilling subcontractor. Sanitary hand wash will be provided within each portable toilet facility to ensure personnel have the capability to wash hands following toilet use and prior to food consumption.

Waste materials will not be allowed to accumulate at routine monitoring sites. Appropriately labeled containers for industrial waste and CERCLA waste (as required) will be maintained at the project site, as stated in the applicable Field Sampling Plan. Personnel should make every attempt to minimize waste through the judicious use of consumable materials. All site personnel are expected to make good housekeeping a priority at the job site.

13. RECORDKEEPING REQUIREMENTS

This section discusses the requirements for recordkeeping for this project.

13.1 Industrial Hygiene and Radiological Monitoring Records

When IH support is required, the industrial hygienist will record airborne monitoring and sampling data (both area and personal) collected for exposure assessments in the INEEL Hazards Assessment and Sampling System database. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures and the manufacturer specifications. IH airborne monitoring and sampling exposure assessment data are treated as limited access information and maintained by the industrial hygienist in accordance with INEEL companywide safety and health manual procedures.

The RCT maintains a record of radiological monitoring, daily project operational activities, and instrument calibrations. Radiological monitoring records are maintained in accordance with companywide manuals.

Project personnel or their representatives have a right to the monitoring and sampling data (both area and personal) from both the industrial hygienist and the RCT. Results from monitoring data also will be communicated to all field personnel during daily plan-of-the-day meetings and formal prejob briefings, in accordance with applicable company policies and procedures.

13.2 Field Team Leader and Sampling Logbooks

Logbooks will be maintained in accordance with applicable company policies and procedures. The FTL will keep a record of daily site events in the FTL logbook and will maintain accurate records of all personnel (e.g., workers and nonworkers) who are onsite each day in a site attendance logbook. Logbooks must be obtained from the field data coordinator for the INEEL Sample and Analysis Management (SAM) Office. The completed logbooks must be returned to the INEEL SAM within 6 weeks of project completion. The logbooks are then submitted to Document Control.

13.3 Document Control

The Document Control organizes and maintains data and reports generated by program field activities. The Document Control maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the project plans, this HASP, the applicable company policies and procedures, the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2004c), and other project-specific documents are maintained in the project file by Document Control.

Completed sample logbooks are submitted to the SAM within 6 weeks of project completion. All other project records and logbooks, except IH logbooks, must be forwarded to the Administrative Record and Document Control (ARDC) within 30 days after completion of field activities.

13.4 Site Attendance Record

If required to be maintained separately, the site attendance record will be used to keep a record of all personnel (i.e., field team members and nonfield team members) onsite each day, and to assist the area warden with conducting personnel accountability should an evacuation take place (see Section 11.3 for

emergency evacuation conditions). Personnel will only be required to sign in and out of the attendance record once each day. The FTL is responsible for maintaining the site attendance record and for ensuring that all personnel on the project site sign in.

13.5 Administrative Record and Document Control Office

The ARDC will organize and maintain data and reports generated by program field activities. The ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the management plans for the program, this HASP, the applicable company policies and procedures, the quality assurance project plan, and other documents pertaining to this work are maintained in the project file by the ARDC.

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